

# Higher Secondary Stage XI-XII

## GUIDELINES AND SYLLABI FOR HIGHER SECONDARY STAGE

253



राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्  
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING





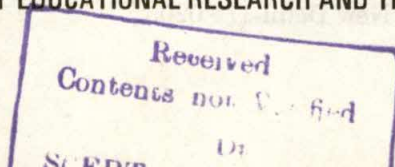


**GUIDELINES AND SYLLABI**  
**FOR**  
**HIGHER SECONDARY STAGE**

*Classes XI-XII*



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NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING





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# THE CONSTITUTION OF INDIA

## PREAMBLE

**WE, THE PEOPLE OF INDIA**, having solemnly resolved to constitute India into a  
<sup>1</sup> [ **SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC** ] and to secure to all its citizens:

**JUSTICE**, social, economic and political;

**LIBERTY** of thought, expression, belief, faith and worship;

**EQUALITY** of status and of opportunity;  
and to promote among them all

**FRATERNITY** assuring the dignity of the individual and the <sup>2</sup> [ unity and integrity of the Nation ];

**IN OUR CONSTITUENT ASSEMBLY** this twenty-sixth day of November, 1949, do  
**HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.**

1. Subs. by the Constitution (Forty-second Amendment) Act, 1976, Sec.2, for "Sovereign Democratic Republic" (w.e.f. 3.1.1977)
2. Subs. by the Constitution (Forty-second Amendment) Act, 1976, Sec.2, for "Unity of the Nation" (w.e.f. 3.1.1977)

## Part IV A Fundamental Duties

### ARTICLE 51A

**Fundamental Duties** – It shall be the duty of every citizen of India—

- (a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
- (b) to cherish and follow the noble ideals which inspired our national struggle for freedom;
- (c) to uphold and protect the sovereignty, unity and integrity of India;
- (d) to defend the country and render national service when called upon to do so;
- (e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;
- (f) to value and preserve the rich heritage of our composite culture;
- (g) to protect and improve the natural environment including forests, lakes, rivers, wild life and to have compassion for living creatures;
- (h) to develop the scientific temper, humanism and the spirit of inquiry and reform;
- (i) to safeguard public property and to abjure violence;
- (j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement.



# Introduction: The Emerging Context

Students offer a common scheme of studies upto ten years of general education. After this, the Higher Secondary Stage assumes great significance as students for the first time move towards diversification. By this time, students start developing their own thinking. As such, they are better placed to exercise a choice of courses keeping in view their needs, interests, capabilities and aptitude, which would enable them to cope with the challenges of future. They may, therefore, choose either specialised academic courses or job-oriented vocational courses at this stage. For majority of students, the Higher Secondary Stage may be the end of their formal education leading to the world of work. For others, it would be a bridge to the tertiary stage of education—academic or professional courses.

Higher Secondary Stage is the stage of maximum challenge. Whether, after completing twelve years of schooling, the students would be able to get into some job or vocation or pursue future studies of their own choice/preference is the uppermost concern in their minds and in the minds of their parents. It causes anxiety and stress, which may be avoided by careful planning and strategies for designing courses suited to their future requirements.

Normally, only a small percentage of student population reaches the tertiary stage. Obviously, it is from amongst them that the eventual leadership emerges. The quality of these people depends on the foundation laid in early years especially at the higher secondary stage. It goes without saying that students at this stage must be fully equipped with basic knowledge, skills, aptitude and entrepreneurship so that they can qualify for self-employment as well.

The *National Curriculum Framework for School Education* (NCFSE), 2000 has emphasised access, equity and excellence at Higher Secondary Stage as well. Considering the changes in socio-educational climates of the country, there is a need to identify the various ingredients and variables that

ultimately determine the quality of education and its end product. In today's world of globalisation marked by competitiveness and challenges, it is required more than ever before that the country sets its own standards comparable to any international standard. The NCFSE recommends that to suit the varied needs and potentialities of students *diversification* and *flexibility* should be the major characteristics of the higher secondary curriculum. Since the interests and aptitudes of students largely stabilise by the time they reach this stage, they should be provided opportunities to pursue courses of their choice keeping in view their inclination and preferences. In the context of the rigidities in the present education system, for instance non-availability of choices which cater to individual differences and interests, and lack of opportunities to move at one's own pace, the content of courses has been made flexible to the extent possible.

In order to bring more flexibility and functionality among courses to be offered at the higher secondary level, the *National Curriculum Framework* recommends *semesterisation* based on *credit system*. Semesterisation offers help in experimenting with the satisfactory tools and techniques of evaluation in general and the learning outcomes in particular. It also supports the idea of *comprehensive and continuous evaluation*.

Courses at the higher secondary stage will fall into two broad streams—academic and vocational. In each of these, there will be a judicious blending of foundation courses and specialised elective courses. The NCFSE, 2000 recommends that the existing groupings like arts, science, commerce and agriculture should not be treated as sacrosanct components. Students should have freedom, within practical limits, to choose subject of study according to their needs, interests and aptitude.

The NCFSE recommends that curriculum at this stage in the academic stream will comprise:

- Foundation Courses, and
- Elective Courses



Foundation courses would consist of languages and literature, work education and health and physical education, games and sports. Coming to elective, a student would be required to choose any three elective courses out of the prescribed subjects.

According to the NCFSE, courses for the vocational stream will consist of:

- Language
- General foundation courses

- Health and physical education
- Vocational electives

After taking into account the numbers of days required for organising evaluation activities, tests, examinations, school functions, etc. a minimum of one hundred and eighty actual instruction days in a year will be available.

The present document will cover the *syllabi* of only the academic courses. For vocational courses, a separate document is being developed.

# LANGUAGES





# हिंदी (आधार)

## भूमिका

उच्चतर स्तर पर विद्यार्थी प्रायः विशिष्ट विषयों के अध्ययन की दिशा में अग्रसर होते हैं। इस स्तर पर ज्ञानार्जन और अभिव्यक्ति के विकास में भाषा की विशिष्ट भूमिका होती है। इन दोनों उद्देश्यों की पूर्ति के लिए उच्चतर माध्यमिक स्तर पर सभी विद्यार्थियों के लिए भाषा और साहित्य का एक समेकित आधार पाठ्यक्रम वांछनीय है।

इस 'आधार पाठ्यक्रम' का मुख्य उद्देश्य है जीवन में भाषा के सही उपयोग और प्रयोग की वांछनीय क्षमता विकसित करना। इस तरह जीवन के विविध संदर्भों में व्यवहार द्वारा और व्यवहार के लिए भाषा सीखना, भाषा शिक्षण कार्यक्रमों का मुख्य उद्देश्य होना चाहिए। व्यावहारिक हिंदी की संकल्पना इस नई दृष्टि का परिचायक है।

प्रयोजनमूलक अथवा व्यावहारिक भाषा की विशद व्याख्या करते हुए एक विख्यात भाषाविद् ने इसकी निम्न भूमिकाओं की चर्चा की है:

1. भाषा एक साधन है जिसके द्वारा हम अपनी आवश्यकताओं की पूर्ति करते हैं।
2. भाषा दूसरों के व्यवहार पर नियंत्रण का साधन है।
3. भाषा सामाजिक संप्रेषण का माध्यम है।
4. भाषा के माध्यम से हमारे व्यक्तित्व का निर्माण होता है।
5. भाषा ज्ञानार्जन का साधन और चिंतन का आधार है।
6. भाषा काल्पनिकता के साथ सृजनात्मकता को बल देती है।
7. भाषा वाह्य (वस्तु) जगत का प्रतिनिधित्व करती है।

विद्यार्थियों के लिए इन भूमिकाओं को परिचय तथा व्यवहार का अर्जन आवश्यक है जिससे वे संदर्भानुकूल भाषा का समुचित संप्रेषण कर सकें।

मनुष्य आरंभ से ही मौखिक भाषा का प्रयोग करता आया है, मानव विकास के इतिहास से इसका सीधा और प्रत्यक्ष संबंध है। भाषा का मौखिक रूप, लिखित रूप की अपेक्षा कम सशक्त और सबल नहीं होता। व्यक्ति मौखिक अभिव्यक्ति द्वारा अपनी बात दूसरों तक पहुंचाता है और दूसरों की बात स्वयं सुनता और समझता है। जीवन में मौखिक अभिव्यक्ति का विशेष महत्त्व है।

प्रस्तुत आधार पाठ्यक्रम में भाषा के व्यावहारिक और उच्च संप्रेषण पक्ष पर विशेष बल दिया गया है, जिससे विद्यार्थी ज्ञान-विज्ञान के विषयों में प्रयुक्त विभिन्न भाषा-रूपों, तत्संबंधी शब्दावली और विशिष्ट लेखन-शैली का परिचय प्राप्त कर अपने अर्जित ज्ञान की लिखित और मौखिक स्तरों पर समुचित अभिव्यक्ति करने में समर्थ हो सकेंगे। पाठ्यक्रम में साहित्य के रसास्वादन पर भी उचित बल दिया गया है, जिससे विद्यार्थियों में जीवन के प्रति मानवीय संवेदना और सम्यक् दृष्टि का भी विकास हो। इस दृष्टि से आधार पाठ्यक्रम के अंतर्गत व्यावहारिक हिंदी का अंश 60 और साहित्य का 40 प्रतिशत होगा।

## सामान्य उद्देश्य

- विद्यार्थियों को हिंदी भाषा की संरचना और विभिन्न व्यवहार-क्षेत्रों में प्रयुक्त भाषा-रूपों की जानकारी देना, जिससे वे विभिन्न सामाजिक संदर्भों में उनका व्यवहार कर सकें;
- विद्यार्थियों में विभिन्न विषयों से संबंधित मौखिक और लिखित अभिव्यक्ति की क्षमता का विकास करना, जिससे वे भाषिक संप्रेषण में दक्षता प्राप्त कर सकें;
- साहित्य के पठन और रसास्वादन की क्षमता विकसित करना;
- विद्यार्थियों को भाषा के माध्यम से भारतीय संस्कृति तथा ज्ञान-विज्ञान संबंधी विभिन्न क्षेत्रों की भाषिक अभिव्यक्ति से परिचित कराना, जिससे उनके चिंतन का धरातल विस्तृत हो सके;
- भारतीय संस्कृति और सभ्यता के प्रति अपेक्षित सम्मान और गौरव की भावना विकसित करना;
- मानवीय जीवन मूल्यों, नागरिकों के मूल; कर्तव्यों, मानवाधिकारों, समाज के प्रति हमारे दायित्वों और पर्यावरण के प्रति जागरूकता पैदा करना।

## विशिष्ट उद्देश्य

- विभिन्न सामाजिक संदर्भों में जैसे वार्तालाप, संवाद, भाषण, उद्घोषणा, आँखों देखा हाल, औपचारिक बैठक आदि के प्रभावी संप्रेषण के लिए उपयुक्त शब्दावली, भाषा-रूपों, अभिव्यक्तियों, शैली रूपों आदि का ज्ञान देना तथा उनका अभ्यास कराना;
- हिंदी भाषा के कौशल (विशेषकर लेखन कौशल) का विकास करना और अभ्यास करना, यथा विशिष्ट तथा फीचर लेखन, सारलेखन, घटनापरक, वर्णनात्मक तथा तार्किक लेखन, भाव पल्लवन आदि;
- हिंदी व्याकरण के विभिन्न व्यावहारिक और प्रयोगपरक पक्षों की विस्तृत जानकारी देना और उनका अभ्यास कराना;
- विभिन्न विषयों या व्यवसायों से संबंधित आधारभूत पारिभाषिक शब्दावली तथा विशिष्ट अभिव्यक्तियों का बोध कराना और उनके समुचित प्रयोग की क्षमता विकसित करना। कुछ मुख्य क्षेत्र हैं- सामाजिक विज्ञान, विज्ञान तथा प्रौद्योगिकी, वाणिज्य-व्यापार, कृषि तथा ग्रामीण विकास, स्वास्थ्य तथा पर्यावरण आदि;
- भावी जीवन में व्यवसायी वृत्ति (जैसे सरकारी या गैरसरकारी सेवा, उद्योग, व्यापार आदि) की दृष्टि से शिक्षार्थी को विद्यालय स्तर पर ही अधिक से अधिक जीवनोपयोगी संदर्भों में प्रयुक्त भाषा का व्यावहारिक ज्ञान देना;



- भावी जीवन में उपयोग के लिए विद्यार्थियों को सूचना प्रौद्योगिकी और कंप्यूटर शिक्षा जैसे आधुनिक साधनों का उपयोग कर सकने में दक्ष बनाने के लिए आधार तैयार करना;
- विद्यार्थी उच्च शिक्षा के क्षेत्र में ज्ञान-विज्ञान से संबंधित विषयों का अध्ययन हिंदी माध्यम से कर सकें, इस उद्देश्य की पूर्ति के लिए उनके भाषा-ज्ञान को समृद्ध करना;
- वाक् प्रतियोगिता, भाषण कला, मंच, संचालन, संवाद-सूत्रधार आदि मौखिक कौशलों के साथ उच्चारण संबंधी अनेक विशेषताओं जैसे सुर, बलाघात तथा अनुतान आदि पर विशेष बल देना;
- हिंदी साहित्य की प्रमुख विधाओं का परिचय कराना, जिससे विद्यार्थी उन विधाओं के रचनामूलक स्वरूप को तथा कथ्य के माध्यम से रचनाकार के संदेश को समझ सकें और उसका आस्वादन कर सकें
- इस पाठ्यक्रम के लिए सेमेस्टर प्रणाली प्रस्तावित है। यह पाठ्यक्रम चार सेमेस्टर्स में विभाजित किया जाएगा। पहला और दूसरा सेमेस्टर कक्षा XI और तीसरा और चौथा सेमेस्टर कक्षा-XII के लिए निर्धारित है।

### पाठ्य सामग्री

आधार पाठ्यक्रम के लिए निम्नलिखित पाठ्य पुस्तकों का निर्माण किया जाएगा :

#### कक्षा-XI

1. गद्य-पद्य संग्रह भाग-1
2. व्यावहारिक हिंदी और व्याकरण (कक्षा XI तथा XII के लिए संयुक्त रूप में एक पुस्तक)
3. पूरक पठन की पुस्तक भाग-1

इन पुस्तकों का पचास प्रतिशत अंश प्रथम सेमेस्टर तथा पचास प्रतिशत अंश द्वितीय सेमेस्टर में पढ़ाया जाएगा।

#### कक्षा-XII

1. गद्य-पद्य संग्रह भाग-2
2. व्यावहारिक हिंदी और व्याकरण (कक्षा XI तथा XII के लिए संयुक्त रूप से एक पुस्तक)
3. पूरक पठन की पुस्तक भाग-2

इन पुस्तकों का पचास प्रतिशत अंश तीसरे तथा पचास प्रतिशत अंश चौथे सेमेस्टर में पढ़ाया जाएगा।

जहाँ सेमेस्टर प्रणाली लागू नहीं होगी वहाँ ये पुस्तकें पूर्व प्रणाली के अनुसार पढ़ाई जाएंगी।

इन पुस्तकों के गद्य के पाठों में साहित्य की विभिन्न विधाओं का समावेश होगा तथा पद्य के पाठों के चयन में नए और पुराने कवियों का प्रतिनिधित्व होगा। साथ ही साथ यह भी ध्यान रखा जाएगा कि हिंदीतर भाषी कवियों/लेखकों की मौलिक/अनुदित रचनाओं को भी सम्मिलित किया जाए ताकि हिंदी के अखिल भारतीय स्वरूप का आभास हो। प्रत्येक

पाठ के अंत में प्रश्न और अभ्यास होंगे। अभ्यास प्रमुखतः रचना तथा भाषा संरचना से संबंधित होंगे।

व्यावहारिक हिंदी और व्याकरण की इस पुस्तक में भाषा के प्रयोजनमूलक/व्यावहारिक पक्षों तथा व्याकरणिक विषयों पर पाठ होंगे। पाठ के अंत में प्रश्न और अभ्यास होंगे।

### व्यावहारिक हिंदी संबंधी पाठ्य बिंदु

- प्रयोजनमूलक/व्यावहारिक हिंदी का स्वरूप और क्षेत्र।
- कार्यालयी पत्राचारों, प्रारूपण और टिप्पण लेखन (प्रारंभिक स्तर के) से परिचय और अभ्यास।
- विभिन्न विभागों से संबंधित समस्याओं (पानी, बिजली, टेलीफोन, परिवहन आदि) के बारे में विभागीय अधिकारियों को पत्र लिखना।
- रोजगार संबंधी आवेदन-पत्र लिखना, स्ववृत्त (बायोडाटा) तैयार करना आदि।
- किसी समारोह के बारे में विवरण सहित निमंत्रण पत्र लिखना।
- बैंक में नकद रुपया या चैक जमा करने संबंधी फार्म भरना, चैक काटना, ड्राफ्ट बनवाना आदि से संबंधित आवश्यक जानकारी देना।
- डाकघर और तारघर संबंधी उपयोगी प्रपत्रों की जानकारी देना और उन्हें भरना सिखाना।
- वार्षिक समारोह, खेलकूद (चित्र सहित), प्रदूषण आदि विषयों पर फीचर तैयार करना।
- विधा रूपांतरण सिखाना जैसे किसी कहानी या गद्यखंड को नाटकीय संवादों में परिवर्तित करना।
- विज्ञापन के विभिन्न रूपों (व्यावसायिक, निविदा, वैवाहिक, जनकल्याण, रोजगार आदि) की जानकारी देना।
- कंप्यूटर, डी.टी.पी. आदि और सूचना प्रौद्योगिकी (ई-मेल, इंटरनेट, वेबसाइट, फैक्स आदि) की संक्षिप्त उपयोगी जानकारी देना तथा सभी प्रकार के जनसंचार माध्यमों/साधनों से परिचित कराना।
- शब्दावली, विश्वकोश, थिसारस (प्रयोगकोश) आदि संदर्भ-ग्रंथों का संक्षिप्त परिचय देना तथा उनका उपयोग सिखाना।
- हिंदी के विषयवार पारिभाषिक शब्दावली की विशेषताओं का ज्ञान कराना।
- पुस्तकालय के महत्त्व और उपयोगिता से परिचित कराते हुए सूचीकरण (केटलॉगिंग) से तथा पुस्तकों को ढूँढ़ने और उसे अपने लिए लेने से संबंधित बातों का अभ्यास कराना।
- उपभोक्ता न्यायालय में शिकायत तथा बैनामा, पंजीकरण (रजिस्ट्री) आदि की भाषा से परिचित कराना।
- टेलीफोन निर्देशिका, रेलवे समय सारणी, मानचित्र आदि देखने का अभ्यास कराना।
- आधुनिक मुद्रण तकनीक का संक्षिप्त परिचय देना।



- देश के पर्यटन स्थलों के यात्रा संबंधी विवरण की प्रस्तुति सिखाना तथा टूरिस्ट गाइड के रूप में मौखिक अभिव्यक्ति सिखाना।

### व्याकरण तथा रचना संबंधी पाठ्य बिंदु

- शब्द का स्वरूप
- शब्द का वर्गीकरण
- शब्द भंडार
- शब्द-निर्माण
- शब्द-भेद
- वाक्य विचार
- वाक्य
- अशुद्धि शोधन
- विराम चिह्न
- रचना खंड के अंतर्गत समसामयिक महत्त्व के कुछ निबंध तथा लोकोक्तियों और मुहावरों पर पाठ रखे जाएंगे।

### पूरक पठन की पुस्तक

पूरक पठन की पुस्तक के लिए निम्नलिखित विषय विचारणीय है :

भारत की महान विभूतियाँ, वैज्ञानिक खोज, स्वतंत्रता आंदोलन का प्रेरक साहित्य, भारतीय संस्कृति की विरासत, जीवनी, आत्मकथाएँ, भारतीय लोकजीवन और लोक संस्कृति आदि विभिन्न क्षेत्रों से संबंधित रोचक ज्ञानवर्धक पाठ्य सामग्री। पूरक पठन पुस्तक किसी एक विधा विशेष अथवा विविध साहित्यिक विधाओं पर आधारित होगी।

### मौखिक अभिव्यक्ति

दैनिक जीवन के अधिकांश कार्य मौखिक अभिव्यक्ति द्वारा ही संपन्न होते हैं। पारिवारिक और सामाजिक स्तर पर वार्तालाप, संभाषण परस्पर बातचीत, सभा-समितियों में विचारों की अभिव्यक्ति, धार्मिक और सांस्कृतिक संदर्भों में विचारों का आदान-प्रदान आदि अनेक कार्यों में मौखिक अभिव्यक्ति का उपयोग और प्रयोग होता है। मौखिक अभिव्यक्ति आत्मप्रकाशन की प्रमुख आवश्यकता है। मौखिक अभिव्यक्ति की महत्ता को ध्यान में रखकर मौखिक भाषा को परीक्षा का अनिवार्य अंग माना जाना चाहिए। इसका सतत मूल्यांकन और इसमें उत्तीर्ण होना अनिवार्य होना चाहिए।

### दृश्य-श्रव्य सामग्री

पाठ्य सामग्री के अंतर्गत दृश्य-श्रव्य सामग्री का आवश्यकतानुसार निर्माण किया जाएगा।

### अतिरिक्त पठन सामग्री

1. कहानी संकलन-2
2. उपन्यास-1
3. जीवनी, संस्मरण, आत्मकथा-1

### 4. कविता संकलन-1

#### विषय क्षेत्र

उक्त पुस्तकों में निम्नलिखित विषय क्षेत्रों से शिक्षण सामग्री ली जाएगी :

#### जीवन के विविध संदर्भ

पौराणिक एवं साहसिक कहानियाँ, त्योहार, खेलकूद, लोककथाएँ, पशु-पक्षी, ग्रामीण और शहरी जीवन, प्रकृति, पर्यावरण-संरक्षण, कृषि और प्रौद्योगिकी, यातायात के साधन, महान विभूतियाँ, मनोरंजन, विभिन्न धर्मों के मूल सिद्धांतों का परिचय एवं सर्वधर्म समभाव, देश की सांस्कृतिक एवं सामासिक संस्कृति के प्रति प्रेम, स्वदेश प्रेम, वसुधैव कुटुंबकम् की भावना का विकास, राष्ट्रीय भावात्मक एकता, नागरिकों के मौलिक अधिकार, मानवाधिकार, जनसंख्या नियंत्रण, स्त्री-पुरुष समानता, दर्शनीय स्थल, विज्ञान (प्रदूषण, दूरभाष, दूरसंचार, कंप्यूटर आदि), कला, पर्व-मेले, राष्ट्रीय चिह्न, राष्ट्र के प्रहरी, यात्रा-वृत्तांत आदि।

#### केंद्रिक घटक और नागरिकों के मूल कर्तव्य

राष्ट्रीय पाठ्यचर्या में दिए गए केंद्रिक घटकों को पाठ्यसामग्री में शामिल करने की आवश्यकता है। ये घटक इस प्रकार हैं :

भारत के स्वतंत्रता आंदोलन का इतिहास, संवैधानिक दायित्व, राष्ट्रीय पहचान के पोषण के लिए आवश्यक विषयवस्तु, भारत की साझी सांस्कृतिक विरासत, समतावाद, लोकतंत्र और पंथ निरपेक्षता, स्त्री-पुरुष समानता, पर्यावरण का संरक्षण, प्रगति में बाधक सामाजिक व्यवधान को समाप्त करना, छोटे परिवार का मानक अपनाना और वैज्ञानिक दृष्टिकोण विकसित करना।

भारतीय संविधान के भाग IV अ के अनुच्छेद 51अ में उल्लिखित मौलिक कर्तव्यों को भी केंद्रिक घटकों में शामिल करना होगा। इसके अनुसार भारत के प्रत्येक नागरिक का यह कर्तव्य होगा कि वह— संविधान का पालन करे और उसके आदर्शों, संस्थाओं, राष्ट्रध्वज और राष्ट्रगान का आदर करे, स्वतंत्रता के लिए हमारे राष्ट्रीय आंदोलन के को प्रेरित करने वाले उच्च आदर्शों को हृदय में संजोए और उनका पालन करे, भारत की संप्रभुता, एकता और अखंडता की रक्षा करे और उसे अक्षुण्ण बनाए रखे, देश की रक्षा करे और आह्वान किए जाने पर राष्ट्र की सेवा करे, भारत के सभी लोगों में समरसता और समान भ्रातृत्व की भावना का निर्माण करे, जो धर्म, भाषा और प्रदेश या वर्ग पर आधारित सभी भेदभावों से परे हो। ऐसी प्रथाओं का त्याग करे जो महिलाओं के सम्मान के विरुद्ध हो, भारत की सामासिक संस्कृति की गौरवशाली परंपरा का महत्त्व समझे और उसका परिरक्षण करे, प्राकृतिक पर्यावरण की, जिसके अंतर्गत वन झील, नदी और वन्य जीव हैं, रक्षा करे और उसका संवर्धन करे तथा प्राणिमात्र के प्रति दया भाव रखे, वैज्ञानिक दृष्टिकोण, मानववाद और ज्ञानार्जन तथा सुधार की भावना का विकास करे, सार्वजनिक संपत्ति को सुरक्षित रखे और हिंसा से दूर रहे, व्यक्तिगत और सामूहिक गतिविधियों के सभी क्षेत्रों में उत्कर्ष की ओर बढ़ने का सतत प्रयास करे, जिससे राष्ट्र निरंतर प्रयत्न करते हुए उपलब्धियों की ऊँचाइयों को छू सके।



### मूल्य परक विषय

सच्चाई, स्वच्छता, शिष्टाचार, सेवा भावना, सहयोग भावना, मित्रतापूर्ण व्यवहार, समय की पाबंदी, नियमितता, उदारता, साहस, श्रम की महत्ता, संदाचार, प्रेम, करुणा, अहिंसा, जिम्मेदारी, सहनशीलता, निष्ठा, देश प्रेम, धर्म निरपेक्षता कर्तव्य भावना, धैर्य आदि।

उपर्युक्त सभी विषय पाठ्यसामग्री के निर्माण में विषयवस्तु के रूप में पिरोए जाएँगे परंतु एक ही पुस्तक में ये सभी विषय शामिल नहीं किए जा सकते हैं इसलिए विद्यार्थी के स्तर और आयु वर्ग के अनुसार विषयों का चयन किया जाएगा।

### शिक्षण युक्तियाँ

- ऐसी शिक्षण-युक्तियों का प्रयोग करना जिनसे विद्यार्थियों में जिज्ञासा करने, स्वाध्याय के लिए प्रोत्साहित होने और समस्या-समाधान की योग्यताओं का पोषण हो।
- शिक्षण में दृश्य-श्रव्य साधनों, जन संचार माध्यमों तथा कंप्यूटर का सहायक सामग्री के रूप में अधिकाधिक उपयोग करना।
- सिखाने या पढ़ाने के बजाय स्वयं सीखने पर अधिक बल देना।
- कक्षा अध्यापन के पूरे कार्य के रूप में सेमीनार, ट्यूटोरियल कार्य, समस्या-समाधान कार्य, समूह-चर्चा, परियोजना कार्य, स्वाध्याय आदि पर विशेष बल देना।
- 11 वीं और 12 वीं कक्षाओं में हिंदी व्याकरण को केवल सैद्धांतिक और औपचारिक रूप में प्रस्तुत करने के बजाय प्रकार्यात्मक रूप में प्रस्तुत करना। तदनुसार भाषा-संरचना संबंधी जो व्याकरणिक सामग्री तैयार की जाए उसमें मुख्यतः व्याकरण और संप्रेषणात्मक शिक्षण बिंदुओं पर बल रहे। भाषा-प्रयोग के इन शिक्षण-बिंदुओं को समुचित उदाहरणों तथा अभ्यास-कार्यों के आधार पर, यथावश्यक उपयुक्त अनुदेशों के साथ, प्रस्तुत किया जाए।
- विद्यार्थियों की मौखिक अभिव्यक्ति में उचित हाव-भाव, सही उच्चारण और अनुतान पर बल देना।

### मूल्यांकन और परीक्षा

विद्यार्थियों के संज्ञानात्मक और सहसंज्ञानात्मक—दोनों प्रकार की क्षमताओं के विकास के लिए मूल्यांकन को प्रभावी ढंग से प्रयोग में लाना अपेक्षित है इसके लिए सतत और समग्र—दोनों रूप में मूल्यांकन किया जाना वांछित है।

### सतत और व्यापक मूल्यांकन

इसके अंतर्गत शैक्षिक विषय क्षेत्र तो रहेंगे ही, उनमें विद्यार्थियों के समग्र विकास की दृष्टि से निर्धारित सह-शैक्षिक क्रियाकलाप भी शामिल होंगे। उच्चतर माध्यमिक कक्षा में सह-शैक्षिक क्षेत्रों में विद्यार्थियों के कार्य का आकलन विद्यालय द्वारा किया जाएगा और विद्यालय इस आकलन को शैक्षिक विषयों की अंक सूची या ग्रेड कार्ड में सम्मिलित करने के लिए बोर्ड को भेजेंगे।

कोर्स को चार सेमेस्टर्स में संयोजित किया जाएगा और वह क्रेडिट प्रणाली पर आधारित होगा। प्रथम तीन सेमेस्टर्स की परीक्षा की जिम्मेदारी विद्यालय की होगी जबकि चौथे सेमेस्टर की परीक्षा बोर्ड द्वारा ली जाएगी।

### अंक विभाजन

मूल्यांकन की दृष्टि से अध्ययन के लिए स्वीकृत शिक्षण सामग्री पर 100 अंक निर्धारित किए जाएँगे जिसका अंक विभाजन इस प्रकार किया जा सकता है :

लिखित 80%

मौखिक 20%

मौखिक परीक्षा में विद्यार्थियों के उच्चारण-प्रवाह, अनुतान, बल आदि पर ध्यान दिया जाएगा। प्रश्नोत्तर, परिचर्चा, भाषण आदि में आत्मविश्वास, तत्परता, वाकपटुता आदि तत्व भी देखे जाएँगे। मौखिक परीक्षा पूर्णतः आंतरिक होगी, अध्यापक सत्रीय और सतत मूल्यांकन के आधार पर अंक प्रदान करेंगे।



## हिंदी (ऐच्छिक)

### भूमिका

दस वर्ष की सामान्य शिक्षा के बाद उच्चतर माध्यमिक स्तर पर पहली बार विद्यार्थी विविधतायुक्त विषयों की ओर उन्मुख होते हैं। किशोरावस्था से युवावस्था में प्रवेश के इस नाजुक मोड़ पर किसी भी विषय का चुनाव करते समय वे और उनके माता-पिता इस बात से सर्वाधिक चिंतित रहते हैं कि चयनित विषय भावे कैरियर और जीविका के अवसरों में मदद करेगा या नहीं। इस उम्र के विद्यार्थियों में चिंतन, तर्क और निर्णय करने की प्रवृत्ति भी शुरू होती है। इसी आधार पर वे अपने मानसिक, सामाजिक, बौद्धिक और भाषिक विकास के प्रति भी चेतनावान होते हैं और अपने भावी अध्ययन की दिशा तय करते हैं।

इस स्तर पर ऐच्छिक हिंदी का अध्ययन एक साहित्यिक और सांस्कृतिक भाषा के रूप में होगा। इसके साथ ही इस बात पर भी विशेष ध्यान दिया जाएगा कि भाषा का व्यावहारिक पक्ष भी प्रबल हो। इस दृष्टि से इस पाठ्यक्रम के अंतर्गत साहित्य का अंश 80 प्रतिशत होगा और व्यावहारिक भाषा का 20 प्रतिशत। इस पाठ्यक्रम के माध्यम से विद्यार्थी जहाँ एक ओर साहित्य की परंपराओं, प्रवृत्तियों, शैलियों, विधाओं, रचनाकारों, साहित्यशास्त्र और साहित्य के इतिहास का अध्ययन करेंगे, वहीं दूसरी ओर वे व्यावहारिक हिंदी के विभिन्न रूपों में दक्षमता और निपुणता भी प्राप्त कर सकेंगे।

इस स्तर पर विद्यार्थियों में भाषा के लिखित प्रयोग के साथ-साथ उसके मौखिक प्रयोग की कुशलता और दक्षता का विकास भी जरूरी है। इस दृष्टि से इस पाठ्यक्रम में यह प्रयास होगा कि विद्यार्थी अपने भावों और विचारों की सहज और मौलिक अभिव्यक्ति की क्षमता भी अर्जित कर सकें।

ऐच्छिक हिंदी के अध्ययन से (i) छात्र-छात्राएँ अपनी रुचि और आवश्यकता के अनुरूप साहित्य का गहन और विशेष अध्ययन जारी रख सकेंगे (ii) विश्वविद्यालय स्तर पर निर्धारित हिंदी साहित्य से संबंधित पाठ्यक्रम के साथ सहज संबद्धता स्थापित कर सकेंगे (iii) व्यावहारिक हिंदी में उपलब्धि-स्तर ऊँचा उठा सकेंगे और (iv) उच्चतर माध्यमिक स्तर की पढ़ाई पूरी करने के बाद यदि वे अध्यापकीय या अन्य व्यवसाय में जाते हैं तो भाषा और साहित्य संबंधी प्रयोग प्रभावी ढंग से कर सकेंगे।

इस प्रकार ऐच्छिक हिंदी के अध्ययन का मुख्य अभिप्राय है एक ऐसी प्रबुद्ध भाषा संपन्न पीढ़ी का निर्माण, जो भाषा तथा साहित्य के विकास के साथ भाषा के उन रूपों और अभिव्यक्तियों से भी परिचित हो जिनका व्यावहारिक जीवन से गहरा संबंध है।

### सामान्य उद्देश्य

- कक्षा 10 तक अर्जित भाषिक कौशलों (सुनना, बोलना, पढ़ना, लिखना और चिंतन) का इस स्तर पर उत्तरोत्तर संवर्धन करना;
- हिंदी साहित्य के गहन अध्ययन द्वारा पूर्व अर्जित साहित्यिक ज्ञान का संवर्धन करना;
- साहित्य की विविध विधाओं, (कविता, कहानी, निबंध, रेखचित्र, संस्मरण, एकांकी आदि) कवियों और लेखकों, प्रमुख धाराओं और शैलियों का परिचय प्राप्त करना;
- साहित्य के सौंदर्यतत्वों का बोध और उनका रसास्वादन करना;
- साहित्यशास्त्र के अंतर्गत रस, छंद, अलंकार आदि का परिचय प्राप्त करना;
- हिंदी साहित्य के इतिहास का सामान्य परिचय प्राप्त करना;
- साहित्यिक अध्ययन संबंधी समालोचनात्मक दृष्टि का विकास करना;
- चिंतन और तर्क करने की प्रवृत्ति का विकास करना;
- साहित्यिक अध्ययन संबंधी समालोचनात्मक दृष्टि का विकास करना;
- सृजनात्मक प्रवृत्ति का विकास करना;
- भारतीय भाषाओं से हिंदी में अनूदित साहित्य का सामान्य परिचय प्राप्त करना;
- राष्ट्रीय एकता के संपर्क-सूत्र के रूप में हिंदी की भूमिका का परिचय प्राप्त करना;
- साहित्य के अध्ययन से देश की सामासिक संस्कृति, नैतिक मूल्यों, परंपराओं के प्रति गर्व की भावना और सद्वृत्तियों का विकास करना;
- व्यवहारिक भाषा की प्रचलित अभिव्यक्तियों (कार्यालयी, जनसंचार तथा सूचना प्रौद्योगिकी आदि) का ज्ञान प्राप्त करना और उनके प्रयोग द्वारा सामाजिक संप्रेक्षण की क्षमता का विकास करना।

### विशिष्ट उद्देश्य

- स्तर के अनुरूप वैचारिक और अनुभूतिपरक गद्य तथा काव्य सामग्री को पढ़कर और सुनकर समझना तथा अर्थ ग्रहण और रसास्वादन करना;
- स्तर के अनुरूप लिखित अभिव्यक्ति में कुशलता प्राप्त कर अपनी स्वतंत्र शैली का विकास करना;
- वाक् प्रतियोगिता, भाषण कला, मंच संचालन, संवाद आदि के



माध्यम से मौखिक अभिव्यक्ति के स्वरूप, महत्व और व्यवहार का विकास करना;

- हिंदी के प्रमुख कवियों, लेखकों और उनकी रचनाओं का सामान्य परिचय प्राप्त करना;
- हिंदी साहित्य के विकास क्रम तथा साहित्य की विविध विधाओं का सामान्य परिचय प्राप्त करना;
- पठित कविता का अर्थ ग्रहण, सौंदर्य तत्वों का बोध, सराहना तथा रसास्वादन करना;
- पठित निबंधों की विषयवस्तु, उसमें दिए गए तर्कों, समाहित उद्धरणों, उदाहरणों तथा लेखक की शैली को समझना;
- पठित कहानी की कथावस्तु, चरित्र-चित्रण, देश-काल और परिस्थिति तथा भाषा शैली और उसमें निहित विचार को समझना;
- एकांकी की कथावस्तु, संवाद-योजना, उद्देश्य और अभिनयात्मक तत्वों को समझना;
- गद्य की अन्य विधाएँ जैसे-रेखाचित्र, संस्मरण, यात्रावृत्तांत, जीवनी, आत्मकथा आदि के साहित्यिक रूप के महत्व की पहचान और भाषा तथा शिल्प संबंधी विशेषताओं को समझना;
- विभिन्न सामाजिक व्यवहार-क्षेत्र में कामकाजी हिंदी का प्रयोग करने की योग्यता विकसित करना;
- जनसंचार माध्यमों में प्रयुक्त होने वाले शब्दों तथा अभिव्यक्ति-रूपों का परिचय प्राप्त करना।

इस पाठ्यक्रम के लिए सेमेस्टर प्रणाली प्रस्तावित है। यह पाठ्यक्रम चार सेमेस्टरों में विभाजित किया जाएगा। पहला और दूसरा सेमेस्टर कक्षा XI के लिए तथा तीसरा और चौथा सेमेस्टर कक्षा XII के लिए निर्धारित है।

### पाठ्य सामग्री

ऐच्छिक हिंदी के पाठ्यक्रम के लिए निम्नलिखित पुस्तकों का निर्माण किया जाएगा :

#### कक्षा-XI

1. गद्य-पद्य संग्रह भाग-एक
2. साहित्य शास्त्र
3. व्यावहारिक हिंदी (कक्षा XI तथा XII के लिए संयुक्त रूप से प्रस्तावित)
4. पूरक पठन की पुस्तक

इन पुस्तकों का पचास प्रतिशत अंश पहले सेमेस्टर में तथा पचास प्रतिशत अंश दूसरे सेमेस्टर में पढ़ाया जाएगा।

#### कक्षा-XII

1. गद्य-पद्य संग्रह भाग-दो
2. हिंदी साहित्य का संक्षिप्त इतिहास

3. व्यावहारिक हिंदी (कक्षा XI तथा XII के लिए संयुक्त रूप से प्रस्तावित)

#### 4. पूरक पठन की पुस्तक

इन पुस्तकों का पचास प्रतिशत अंश तीसरे सेमेस्टर में तथा पचास प्रतिशत अंश चौथे सेमेस्टर में पढ़ाया जाएगा।

जहाँ सेमेस्टर प्रणाली लागू नहीं होगी वहाँ ये पुस्तकें पूर्व प्रणाली के अनुसार पढ़ाई जाएँगी।

गद्य-पद्य संग्रह भाग एक और दो में गद्य खंड के लिए हिंदी गद्य की प्रमुख विधाओं निबंध, कहानी, संस्मरण, जीवनी, आत्मकथा, यात्रावृत्तांत, रेखाचित्र आदि का संकलन किया जाएगा। पद्य खंड में विभिन्न काल के प्रमुख और प्रतिनिधि कवियों की रचनाओं का समावेश रहेगा। पाठ के प्रारंभ में रचनाकार और पाठ का संक्षिप्त परिचय और पाठ के अंत में प्रश्न-अभ्यास दिए जाएँगे। दोनों पुस्तकों के लिए स्तरानुकूल रोचक सामग्री का चयन किया जाएगा।

साहित्यशास्त्र की पुस्तक (कक्षा 11) में साहित्य की परिभाषा और प्रयोजन, शब्द-शक्तियाँ, काव्य-गुण, काव्य-दोष, रस, छंद, अलंकार, साहित्यिक विधाओं तथा समकालीन आलोचना आदि का परिचय दिया जाएगा और प्रसंगानुकूल आवश्यक उदाहरण दिए जाएँगे।

हिंदी साहित्य के संक्षिप्त इतिहास की पुस्तक (कक्षा 12) में हिंदी साहित्य के इतिहास का काल, विभाजन, नामाकरण तथा प्रत्येक काल की प्रमुख प्रवृत्तियों, रचनाओं, रचनाकारों आदि का संक्षिप्त परिचय दिया जाएगा। विविध साहित्यिक विधाओं के विकास का परिचय भी दिया जाएगा और लोक साहित्य तथा हिंदी साहित्य के अखिल भारतीय स्वरूप को भी ध्यान में रखा जाएगा।

व्यावहारिक हिंदी (कक्षा XI तथा XII के लिए संयुक्त रूप से प्रस्तावित) इस पुस्तक में भाषा के व्यावहारिक और प्रयोजनपरक पक्षों से संबंधित पाठ होंगे। इनके माध्यम से विद्यार्थी जीवन के विभिन्न संदर्भों में प्रयुक्त होने वाली भाषा से परिचय प्राप्त कर सकेंगे। व्यावहारिक हिंदी संबंधी विषय इस प्रकार हैं :

व्यावहारिक हिंदी का स्वरूप और क्षेत्र, राष्ट्रभाषा, राजभाषा और संपर्क भाषा के रूप में हिंदी का परिचय, राजभाषा हिंदी की संवैधानिक स्थिति, सरकारी और निजी क्षेत्र के कार्यालयों से संबंधित पत्राचार, प्रतिवेदन, कार्यसूची, कार्यवृत्त, लेखा संबंधी भाषा का परिचय, प्रशासनिक शब्दावली और अभिव्यक्तियाँ। (कक्षा XI के लिए प्रस्तावित)

जन संचार के प्रकार और उसकी भाषा का स्वरूप, पत्रकारिता के प्रकार और विभिन्न इकाईयों का परिचय, शीर्षक लेखन, समाचार लेखन संवाद लेखन, सार लेखन, डायरी लेखन, फीचर लेखन, संपादकीय लेखन, विज्ञापन लेखन और रेडियो-टीवी के लिए लेखन, सूचना प्रौद्योगिकी के अंतर्गत कंप्यूटर इंटरनेट, ई-मेल, फैंक्स, संचार माध्यमों संबंधी शब्दावली और अभिव्यक्तियाँ आदि। (कक्षा XII के लिए प्रस्तावित)

पूरक पठन की पुस्तकें हिंदी साहित्य की किसी एक विधा पर होंगी जैसे- कहानी संकलन, निबंध संकलन, एकांकी संकलन, उपन्यास, नाटक, खंड



काव्य आदि। पूरक पठन की पुस्तकों का निर्माण विद्यार्थियों में भाषिक और साहित्यिक अध्ययन संबंधी योग्यताओं के विकास के लिए किया जाएगा।

### मौखिक अभिव्यक्ति

भाषा का वास्तविक स्वरूप बोल-चाल की प्रक्रिया में निर्मित और व्यक्त होता है। व्यक्ति के भावों और विचारों की अधिकांश अभिव्यक्ति मौखिक रूप में ही होती है। पारिवारिक और सामाजिक स्तर पर वार्तालाप, संभाषण, परस्पर बातचीत, सभा-समितियों में विचारों की अभिव्यक्ति, समाजिक और सांस्कृतिक संदर्भों में विचारों का आदान-प्रदान आदि अनेक कार्यों में मौखिक अभिव्यक्ति का प्रयोग होता है। भाषा की मौखिक अभिव्यक्ति न केवल अधिक व्यापक है अपितु अपने प्रयोग के क्षेत्र में कहीं अधिक प्रभावशाली भी है। मौखिक अभिव्यक्ति के महत्व को देखते हुए पाठ्यक्रम और परीक्षा में उसे उचित स्थान दिया जाना चाहिए।

घर-परिवार संबंध, पड़ोस और परिवेश, विद्यालयी दिनचर्या, विभिन्न जीवन स्थितियाँ, साहित्य और संस्कृति आदि क्षेत्रों से जुड़े विभिन्न विषयों का समावेश मौखिक अभिव्यक्ति के लिए किया जा सकता है।

### दृश्य-श्रव्य सामग्री

पाठ्य पुस्तकों के अध्ययन तथा मौखिक अभ्यास के लिए आवश्यकतानुसार दृश्य-श्रव्य कार्यक्रमों का निर्माण किया जाएगा।

### अतिरिक्त पठन सामग्री

ग्यारहवीं तथा बारहवीं कक्षा में पढ़ने वाले विद्यार्थियों को स्वाध्याय और ज्ञानवर्धन के लिए पाठ्यपुस्तकों के अतिरिक्त प्रत्येक वर्ष हिंदी साहित्य की विभिन्न विधाओं से संबंधित कम से कम दस अतिरिक्त पुस्तकें पढ़नी होंगी। इन पुस्तकों की परीक्षा न होकर उनके पठन और समझ की अनौपचारिक जाँच होगी। अतिरिक्त पठन हेतु पुस्तकों की प्रस्तावित सूची:

कहानी संकलन-4, एकांकी संकलन-2, उपन्यास-4, नाटक-2, निबंध संकलन-2, कविता संकलन-2, जीवनी/संस्मरण/आत्मकथा/यात्रा वर्णन-4

अध्यापक और पुस्तकालय की सहायता से विद्यार्थी को अपनी रुचि के अनुसार पुस्तकें चुनकर पढ़नी चाहिए।

### विषय क्षेत्र

उक्त पाठ्यपुस्तकों में निम्नलिखित क्षेत्रों से शिक्षण सामग्री ली जाएगी :

- जीवन के विविध संदर्भ
- केंद्रिक घटक और नागरिकों के मूल कर्तव्य
- मूल्य परक विषय

### जीवन के विविध संदर्भ

पौराणिक एवं साहसिक कहानियाँ, त्योहार, लोककथाएँ, पशु-पक्षी, ग्रामीण और शहरी जीवन, प्रकृति, पर्यावरण-संरक्षण, कृषि और प्रौद्योगिकी, यातायात के साधन, महान विभूतियाँ, खेल-कूद, मनोरंजन विभिन्न

धर्मों के मूल सिद्धांतों का परिचय एवं सर्वधर्म समभाव, देश की सांस्कृतिक एवं सामासिक संस्कृति के प्रति प्रेम, स्वदेश प्रेम, वसुधैव कुटुंबकम् की भावना का विकास, राष्ट्रीय भावात्मक एकता, नागरिकों के मौलिक अधिकार, मानवाधिकार, जनसंख्या नियंत्रण, स्त्री-पुरुष समानता, दर्शनीय स्थल, विज्ञान (प्रदूषण, दूरभाष, दूरसंचार, कंप्यूटर आदि), कला, पर्व-मेले, राष्ट्रीय चिह्न, राष्ट्र प्रहरी, यात्रा वृत्तांत आदि।

### केंद्रिक घटक और नागरिकों के मूल कर्तव्य

राष्ट्रीय पाठ्यचर्या में दिए गए केंद्रिक घटकों को पाठ्यसामग्री में शामिल करने की आवश्यकता है।

ये घटक इस प्रकार हैं :

भारत के स्वतंत्रता आंदोलन का इतिहास, संवैधानिक दायित्व, राष्ट्रीय पहचान के पोषण के लिए आवश्यक विषय-वस्तु, भारत की साझी सांस्कृतिक विरासत, समतावाद, लोकतंत्र और पंथ निरपेक्षता, स्त्री-पुरुष समानता, पर्यावरण का संरक्षण, प्रगति में बाधक सामाजिक व्यवधान को समाप्त करना, छोटे परिवार का मानक अपनाना और वैज्ञानिक दृष्टिकोण विकसित करना। भारतीय संविधान के भाग IV अ के अनुच्छेद 51 अ में उल्लिखित मौलिक कर्तव्यों को भी केंद्रिक घटकों में शामिल करना होगा। इसके अनुसार भारत के प्रत्येक नागरिक का यह कर्तव्य होगा कि वह-

संविधान का पालन करे और उसके आदर्शों, संस्थाओं, राष्ट्रध्वज और राष्ट्रगान का आदर करे, स्वतंत्रता के लिए हमारे राष्ट्रीय आंदोलन को प्रेरित करने वाले उच्च आदर्शों को हृदय में संजोए और उसका पालन करे, भारत की संप्रभुता, एकता और अखंडता की रक्षा करे, और उसे अक्षुण्ण बनाए रखे, देश की रक्षा करे और आह्वान किए जाने पर राष्ट्र की सेवा करें, भारत के सभी लोगों में समरसता और समान भ्रातृत्व की भावना का निर्माण करे, जो धर्म, भाषा और प्रदेश या वर्ग पर आधारित सभी भेदभावों से परे हो। ऐसी प्रथाओं का त्याग करे जो महिलाओं के सम्मान के विरुद्ध हो, भारत की सामासिक संस्कृति की गौरवशाली परंपरा का महत्त्व समझे और उसका परिरक्षण करे, प्राकृतिक पर्यावरण की, जिसके अंतर्गत वन, झील, नदी और वन्य जीव हैं, रक्षा करे और उसका संवर्धन करे तथा प्राणिमात्र के प्रति दया भाव रखे, वैज्ञानिक दृष्टिकोण, मानववाद और ज्ञानार्जन तथा सुधार की भावना का विकास करे, सार्वजनिक संपत्ति को सुरक्षित रखे और हिंसा से दूर रहे, व्यक्तिगत और सामूहिक गतिविधियों के सभी क्षेत्रों में उत्कर्ष की ओर बढ़ने का सतत प्रयास करे, जिससे राष्ट्र निरंतर प्रयत्न करते हुए उपलब्धियों की ऊँचाइयों को छू सके।

### मूल्य परक विषय

सच्चाई, स्वच्छता, शिष्टाचार, सेवा भावना, सहयोग भावना, मित्रतापूर्ण व्यवहार, समय की पाबंदी, नियमितता, उदारता, साहस, श्रम की महत्ता, सदाचार, प्रेम, करुणा, अहिंसा, जिम्मेदारी, सहनशीलता, निष्ठा, देश प्रेम, धर्म निरपेक्षता, कर्तव्य भावना, धैर्य आदि।

उपर्युक्त सभी विषय पाठ्यसामग्री के निर्माण में विषयवस्तु के रूप में पिरोए जाएँगे परंतु एक ही पुस्तक में ये सभी विषय शामिल नहीं किए जा



सकते हैं, इसलिए विद्यार्थी के स्तर और आयु वर्ग के अनुसार विषयों का चयन किया जाएगा।

### शिक्षण युक्तियाँ

इस स्तर पर विद्यार्थी को सिखाने या पढ़ाने की बजाय स्वयं सीखने पर जोर देना अपेक्षित है। उनमें जिज्ञासा पैदा करने, स्वाध्याय को प्रोत्साहन देने और समस्या समाधान की योग्यता विकसित करने के लिए इलेक्ट्रॉनिक मीडिया कंप्यूटर सहित नवीन तकनीकों का उपयोग भी आवश्यक है। हिंदी भाषा शिक्षण की युक्तियों को दो भागों में विभाजित किया जा सकता है-

(i) साहित्य के शिक्षण से संबंधित, और

(ii) व्यावहारिक भाषा से संबंधित

- कविता-शिक्षण के लिए आलोचनात्मक सराहना, व्याख्या, विश्लेषण प्रणाली का उपयोग
- कविता का मौखिक पाठ और मानक पाठ के लिए दृश्य श्रव्य माध्यम का उपयोग
- कहानी की विषयवस्तु, पात्र, भाषा-शैली, विचार आदि तत्वों के आधार पर विवेचना प्रणाली
- एकांकी के तत्वों के साथ-साथ संवाद और अभिनयात्मकता पर विशेष बल
- निबंध में विचार, भाषा-शैली आदि के आधार पर व्याख्या और विश्लेषण
- व्यावहारिक भाषा के अंतर्गत पत्रकारिता और जनसंचार से संबंध विभिन्न विषयों के लेखन का अभ्यास
- औपचारिक/अनौपचारिक पत्रों, संदेशों और कामकाजी भाषा के प्रयोग से संबंधित लेखन का अभ्यास
- मौखिक कौशलों के विकास के लिए समूह चर्चा, सेमीनार, वाद-विवाद, काव्य पाठ, कहानी कथन, अभिनय, द्यूटोरियल, दृश्य-श्रव्य माध्यम और उच्चारण प्रयोगशाला आदि का उपयोग।

### मूल्यांकन और परीक्षा

विद्यार्थियों में सज्ञानात्मक और सह-संज्ञानात्मक दोनों ही क्षमताओं के विकास के लिए मूल्यांकन का प्रभावी ढंग प्रयोग में लाया जाएगा। मूल्यांकन को मानवीय, विद्यार्थी-मित्रवत और लचीला बनाने के लिए विद्यालय आधारित मूल्यांकन (सतत और व्यापक) पर बल देना होगा।

### सतत और व्यापक मूल्यांकन

इसके अंतर्गत शैक्षिक विषय क्षेत्र तो रहेंगे ही, उनमें विद्यार्थियों के समग्र विकास की दृष्टि से निर्धारित सह-शैक्षिक क्रियाकलाप भी शामिल होंगे। उच्चतर माध्यमिक कक्षा में सह-शैक्षिक क्षेत्रों में विद्यार्थियों के कार्य का आकलन विद्यालय द्वारा किया जाएगा और विद्यालय इस आकलन को शैक्षिक विषयों की अंक सूची या ग्रेड कार्ड में सम्मिलित करने के लिए बोर्ड को भेजेंगे।

कोर्स को चार सेमेस्टर्स में संयोजित किया जाएगा और वह क्रेडिट प्रणाली पर आधारित होगा। प्रथम तीन सेमेस्टर्स की परीक्षा की जिम्मेदारी विद्यालय की होगी जबकि चौथे सेमेस्टर की परीक्षा बोर्ड द्वारा ली जाएगी।

### अंक विभाजन

मूल्यांकन की दृष्टि से अध्ययन के लिए स्वीकृत शिक्षण सामग्री पर 100 अंक निर्धारित किए जाएंगे जिसका अंक विभाजन इस प्रकार किया जा सकता है :

लिखित 80%

मौखिक 20%

मौखिक परीक्षा में विद्यार्थियों के उच्चारण-प्रवाह, अनुतान, बल आदि पर ध्यान दिया जाएगा। प्रश्नोत्तर, परिचर्चा, भाषा आदि में आत्मविश्वास, तत्परता, वाकपटुता आदि तत्व भी देखे जाएंगे। मौखिक परीक्षा पूर्णतः आंतरिक होगी, अध्यापक सत्रीय और सतत मूल्यांकन के आधार पर अंक प्रदान करेंगे।



## اردو مادری زبان

ٹیلی ویژن کی بات چیت، ادبی جلسوں وغیرہ میں شریک ہو سکیں۔  
زبان کا صحیح استعمال کر سکیں اور روانی سے بول سکیں۔ اپنے جذبات و  
خیالات کا صحیح اظہار کر سکیں۔ تعریف و تحسین اور طنز و تعریض کا مطلب  
سمجھ سکیں اور مناسب جواب دے سکیں۔ الفاظ کا اور اظہار کے مختلف  
اسالیب کا بر محل استعمال کر سکیں

- 2- بولنے والے کے جذبات اور خیالات کو سمجھ کر اپنی رائے قائم کر سکیں
- 3- کسی خاص نکتے کی وضاحت کے لیے دلائل پیش کر سکیں اور مثالیں  
دے سکیں
- 4- مضمون پر بحث و مباحثہ اور خیالات کا تجزیہ کر سکیں اور ادبی اقتباسات  
پر تنقیدی نظر ڈال سکیں
- 5- مختلف ادبی اصناف کی خصوصیات کو سمجھ کر اپنے خیالات کا اظہار  
کر سکیں

- 6- پڑھے ہوئے مواد پر پوچھے گئے سوالات کا جواب دے سکیں
- 7- معیار کے مطابق دیے گئے موضوع پر تبادلہ خیال کر سکیں
- 8- کسی موضوع پر زبانی اور تحریری اظہار کی صلاحیت کا ثبوت دے سکیں

### (ب) پڑھنا اور لکھنا

- 1- سنی اور پڑھی ہوئی عبارتوں کا خلاصہ لکھ سکیں اور اشعار کی تشریح  
کر سکیں
- 2- غیر نصابی نثر کا خلاصہ لکھ سکیں
- 3- مختلف ادبی اصناف پڑھ کر اپنے جذبات، خیالات، تجربات اور

تعلیم کی اس منزل پر قدم رکھنے سے پہلے طلبہ دسویں جماعت تک اردو کا بطور مادری  
زبان مطالعہ کر چکے ہیں۔ امید کی جاتی ہے کہ ان میں سننے، بولنے، پڑھنے اور لکھنے کی  
صلاحیتوں کی خاطر خواہ نشوونما ہو چکی ہوگی۔ طلبہ اب اپنے سماجی اور کاروباری کاموں  
کے لیے حسب ضرورت زبان کا استعمال کرنے کا شعور بھی حاصل کر چکے ہوں گے۔ وہ  
درجہ نو اور دس میں چوں کہ اردو ادب کا مطالعہ بھی شروع کر چکے ہیں اس لیے درجہ گیارہ  
اور بارہ میں نسبتاً بہتر لسانی اور ادبی قابلیت پیدا کرنا اس تعلیمی نصاب کا بنیادی مقصد  
ہوگا۔ اس تعلیمی نصاب کے ذریعے طلبہ میں ترسیل و ابلاغ، ادب کی روشناسی کا شعور،  
تبادلہ خیال، پڑھنے، لکھنے اور مطالعے کی صلاحیتوں میں اضافہ کرنا ہوگا اور زندگی اور  
اس کے مختلف معاملات کے متعلق انسانی، عالمی اور اخلاقی اقدار کو بھی فروغ دینا ہوگا۔  
ایک مناسب تناسب پر مشتمل زبانی اور عملی کام کی جانچ بھی کی جائے گی۔ اس سطح پر  
جانچ کا مقصد طلبہ کو صرف گریجویشن کے لیے ہی تیار کرنا نہیں ہے بلکہ انھیں کامیاب  
زندگی کے لیے فعال بھی بنانا ہے۔

پورا نصاب چار سمسٹر پر مشتمل ہوگا۔ پہلے تین سمسٹر کے امتحان کی ذمہ داری  
اسکول پر ہوگی جب کہ چوتھے سمسٹر کا امتحان بورڈ کے ذریعہ ہوگا۔ ان میں ہر سمسٹر  
80 نمبر کے تحریری امتحان اور 20 نمبر کے زبانی/عملی کام کے امتحان پر مشتمل ہوگا۔

## اردو کی تعلیم کے عام مقاصد

### (الف) سننا اور بولنا

- 1- طلبہ معیاری زبان میں گفتگو کر سکیں۔ مذاکرہ، بحث و مباحثہ، ریڈیو،



- 9- رہنمائی
- 4- اقتباسات نظم و نثر میں مضمر جذبات و خیالات کو سمجھ کر اہم نکات کا انتخاب کر سکیں اور ان کی اہمیت کے پیش نظر ان کو مرتب کر سکیں
- 5- بول چال کی زبان اور ادبی زبان کا فرق سمجھنے کی صلاحیت
- 6- اردو زبان اور ادب کے ارتقا کا تعارف
- 7- زبان کے تجربے کی بنیادی صلاحیت
- 8- درخواست، دعوت نامہ، خیریت کا خط، تعزیتی خط، مبارک باد کا خط لکھ سکتا، تار دینا، مختلف فارموں کو پُر کرنا
- 9- مختلف ذرائع سے مواد جمع کر کے دیے گئے موضوع پر مضمون لکھنا
- 10- ایمانداری
- 11- ذمہ داری کا احساس اور فرض شناسی
- 12- اعلا اصولوں کی پابندی
- 13- وقت کی پابندی
- 14- حب الوطنی، قومی یک جہتی
- 15- جمہوریت
- 16- رواداری، تمام مذاہب کا احترام
- 17- سوشلزم، مساوات، سب سے برابر کا سلوک
- 18- اپنی قومی اور تہذیبی روایات پر بجا فخر
- 19- وطن کے لیے ایثار اور قربانی کا جذبہ
- ذخیرہ الفاظ

1- مقررہ معیار کے مطابق الفاظ، محاوروں، کہاوتوں اور تراکیب کے علم میں اضافہ

2- مادوں، سائقوں، لائقوں کی مدد سے نئے الفاظ بنانا

3- مترادف اور متضاد الفاظ کو پیش کر سکتا اور ان کا فرق جاننا

4- لغت کی مدد سے نئے الفاظ کے مطالب معلوم کرنا

## امدادی کتابیں

(گیارھویں اور بارھویں جماعت)

- آسان ادبی تخلیقات: ناول، افسانے، انشائیے
- آسان نظموں اور غزلوں کے انتخابات
- ادیبوں اور شاعروں کے بارے میں آسان کتابیں
- حکایات
- جاتک کہانیاں
- ہندوستانی لوک کہانیاں
- دوسرے ملکوں کی لوک کہانیاں
- ہندوستان کی تاریخ پر آسان کتابیں
- قومی تہذیب و تمدن پر آسان کتابیں
- سماجی معلومات کی آسان کتابیں
- قومی رہنماؤں کی سوانح عمریاں
- دنیا کے بڑے لوگوں کی سوانح عمریاں

## انسانی، قومی اور اخلاقی اقدار

نصابی کتاب تیار کرتے وقت مندرجہ ذیل اقدار کا ضرورت کے مطابق خیال رکھنا ہوگا۔

1- سچائی، حق، صداقت

2- نیکی، خیر، بھلائی

3- خدمتِ خلق، انسان دوستی، بھائی چارہ

4- تعاون اور ہمدردی

5- محبت

6- ہمت، حوصلہ، عزم، شجاعت

7- عدل و انصاف

8- کام میں پہل کرنا



- 3- تحریکات: سرسید تحریک، ترقی پسند تحریک، جدیدیت  
4- اصنافِ ادب کا ارتقا: ناول، افسانہ، غزل، نظم

- تاریخی کہانیاں  
— سائنس کے بارے میں آسان کتابیں  
— کھیل کود پر آسان کتابیں

## اردو قواعد

## ادبی اصناف

نثری اصناف: داستان، ناول، افسانہ، مضمون، انشائیہ، سوانح عمری، سفر نامہ،

خاکہ، رپورتاژ

علم بیان و بدیع اور فنِ شاعری

علم بیان: تشبیہ، استعارہ، مجاز، مرسل، کنایہ

شعری اصناف: غزل، قصیدہ، مرثیہ، مثنوی، رباعی، قطعہ، نظم، آزاد نظم، نظم معرّی

علم بدیع: صنائع معنوی: ایہام، تجاہل، عارفانہ، تلخیص، حسن تعلیل، جشو، مبالغہ،

مراعات النظر

اردو ادب کی تاریخ

صنائع لفظی: تجنیس، تکرار، ضلع جگت

فنِ شاعری: قافیہ، ردیف، وزن، مطلع، مقطع

1- اردو زبان کے آغاز اور ارتقا کا جائزہ

2- دبستان: دکن، دہلی، لکھنؤ



## تعلیمی نصاب کا خاکہ

گیارہویں جماعت

پہلا پرچہ

وقت: 3 گھنٹے

100 نمبر

15

15

15

10

10

10

5

80

20

100

پہلا سمسٹر

-1

تشریح و نثر

-2

تشریح و نظم

-3

تحقیقی سوالات

-4

تاریخ ادب اردو

-5

مکتوب نگاری / درخواست

-6

خلاصہ (غیر نصابی عبارت)

-7

قواعد

زبانی / عملی کام کا امتحان



گیارہویں جماعت

دوسرا پرچہ

وقت: 3 گھنٹے

100 نمبر

15	1- تشریح نثر	دوسرا سمسٹر
15	2- تشریح نظم	
15	3- تنقیدی سوالات	
10	4- تاریخ ادب اردو	
10	5- بدیع و بیان	
10	6- غیر نصابی اقتباس پر سوالات	
5	7- محاورے	
80		
20	زبانی/عملی کام کا امتحان	
100		



بارہویں جماعت

تیسرا پرچہ

وقت: 3 گھنٹے

100 نمبر

تیسرا سمسٹر

15

1- تشریح نثر

15

2- تشریح نظم

15

3- تنقیدی سوالات

10

4- تاریخ ادب اردو

10

5- ترجمہ نگاری (ایک انگریزی پیرا گراف اور ایک ہندی علاقائی زبان کا پیرا گراف)

10

6- رموز و اوقاف

5

7- قواعد

80

20

زبانی/عملی کام کا امتحان

100



## بارھویں جماعت

### چوتھا پرچہ

100 نمبر

وقت: 3 گھنٹے

چوتھا سمسٹر

15

1- تشریح نثر

15

2- تشریح نظم

15

3- تنقیدی سوالات

10

4- تاریخ ادب اردو

10

5- مضمون نگاری

10

6- بدیع و بیان

5

7- ضرب الامثال

80

20

زبانی/عملی کام کا امتحان

100





## عام مرکزی اجزا (Common Core Components)

- 1- آئین کی پابندی اور اس کے اصولوں، اداروں نیز قومی پرچم اور قومی ترانے کا احترام
  - 2- ان نیک تصورات/خیالات کی پرورش کرنا اور ان پر عمل کرنا جنہوں نے جنگ آزادی کی جدوجہد میں روح پھونکی
  - 3- ہندوستان کی حکومت، اتحاد اور یک جہتی کی حمایت کرنا اور اس کی حفاظت کرنا
  - 4- ملک کا دفاع کرنا اور ضرورت پڑنے پر قومی خدمات بجالانا
  - 5- مذہبی، لسانی اور علاقائی یا گروہی تنوع کے باوجود ہندوستانی عوام میں اتحاد و اتفاق اور بھائی چارے کے جذبے کو فروغ دینا۔ ایسے رسم و رواج سے دست بردار ہونا جو خواتین کی قدر و منزلت کے خلاف ہوں
  - 6- اپنے شاندار مشترکہ تہذیبی ورثہ کا تحفظ اور قدر کرنا
  - 7- قدرتی ماحول بشمول جنگلوں، جھیلوں، ندیوں اور جنگلی جانوروں کی حفاظت کرنا
  - 8- سائنسی مزاج، انسان دوستی اور تجسس و اصلاح کا جذبہ پیدا کرنا
  - 9- جائیداد عامہ (Public Property) کی حفاظت کرنا اور تشدد کو ترک کرنا
  - 10- انفرادی اور اجتماعی سرگرمیوں کے سبھی میدانوں میں بہتر کوشش کرنا تاکہ ملک/قوم، کوشش اور کامیابی کی اعلا منزلوں کی طرف مسلسل گامزن ہو
- ان مرکزی اجزا کو اسکول کے نصاب میں مناسب طریقے سے شامل کرنے کی ضرورت ہے۔ یہ اجزا یقیناً قومی اشتراک کا شعور اور قدروں کو پیدا کرنے میں مددگار ہوں گے اور ایسی قوم/جماعت اور نظام قدر کی تخلیق کریں گے جس سے عام ہندوستانی شخص کو تقویت حاصل ہوگی۔
- 1- ہندوستان کی تحریک آزادی کی تاریخ
  - 2- آئین کی پابندی
  - 3- قومی شخص کی نشوونما
  - 4- ہندوستان کا عام تہذیبی ورثہ
  - 5- مساوات، جمہوریت اور سیکولر ازم
  - 6- جنسی مساوات
  - 7- ماحولیاتی تحفظ
  - 8- سماجی تفریق کو ختم کرنا
  - 9- چھوٹے کنبے کے تصور کو فروغ دینا
  - 10- سائنسی مزاج کا فروغ
- ان مرکزی اجزا کے علاوہ آئین ہند کے آرٹیکل 51 A میں مذکورہ بنیادی فرائض کو بھی عام مرکزی اجزا میں شامل کیا گیا ہے۔ یہ بنیادی فرائض درج ذیل ہیں:



# संस्कृत (ऐच्छिक)

## भूमिका

संस्कृत विश्व की एक अति प्राचीन भाषा है। यह अधिकांश भारतीय भाषाओं की जननी एवं सम्पोषिका रही है। भारतीय संस्कृति, धर्म, दर्शन, अध्यात्म, इतिहास, पुराण, भूगोल, राजनीति एवं विज्ञान की मूल स्रोत संस्कृत भाषा आज भी भारत का गौरव एवं प्राण है। राष्ट्रीय भावात्मक एकता एवं अन्तर्राष्ट्रीयता की भावना के विकास में संस्कृत का योगदान अपूर्व रहा है। छात्रवर्ग के सर्वांगीण विकास हेतु मानवीय मूल्यों की उदात्त व्याख्या कर 'वसुधैव कुटुम्बकम्' के आदर्श की स्थापना करना संस्कृत की एक अनुपम देन है। अतः राष्ट्र की इस अमूल्य निधि को छात्रों के समक्ष प्रस्तुत करना नितान्त आवश्यक है। तदनुसार वरिष्ठ माध्यमिक स्तर पर (कक्षा XI-XII) ऐच्छिक विषय के रूप में संस्कृत के पठन-पाठन का प्रावधान किया गया है।

## सामान्य उद्देश्य

इस स्तर पर संस्कृत के पठन-पाठन के उद्देश्य निम्नांकित हैं :

- छात्रों में संस्कृत साहित्य के प्रति अभिरुचि उत्पन्न करना तथा उसकी विविध विधाओं से परिचित कराना;
- संस्कृत भाषा के सामान्य ज्ञान को सुदृढ़ करना तथा उसकी प्रकृति से छात्रों को परिचित कराना;
- छात्रों में राष्ट्रीय, सांस्कृतिक, सामाजिक एवं आध्यात्मिक चेतना जागृत करना;
- छात्रों में नैतिक मूल्यों का विकास करना;
- व्यक्तित्व के सर्वांगीण विकास हेतु छात्रों को प्रेरित करना।

## विशिष्ट उद्देश्य

### श्रवण

- संस्कृत के सरल काव्यांशों को सुनकर तथा अभिनय को देखकर अर्थग्रहण करते हुए रसास्वादन कर सकना।

### वाचन (पठन)

- संस्कृत पद्यों का शुद्ध उच्चारण (लघु, गुरु, यति आदि का समुचित पालन) करते हुए, सस्वर पाठ करने की क्षमता उत्पन्न करना;
- संस्कृत गद्य का शुद्ध उच्चारण करते हुए वाचन की क्षमता उत्पन्न करना;
- संकलित नाट्यांशों का अभिनय पूर्वक वाचन करना;

- सरल प्रश्नों के संस्कृत में उत्तर देने की क्षमता उत्पन्न करना।

### लेखन

- संस्कृत व्याकरण के सामान्य ज्ञान द्वारा संस्कृत वाक्यों की रचना करने की क्षमता उत्पन्न करना;
- संस्कृत साहित्य की विविध विधाओं (गद्य, पद्य, नाटक आदि) का परिचय कराना तथा उन्हें अपने शब्दों में लिखना;
- संस्कृत के बहुप्रयुक्त छन्दों एवं अलंकारों का सोदाहरण लक्षण लिखना।

### चिन्तन

- छात्रों में संस्कृत साहित्य में उपलब्ध राष्ट्रीय भावनाओं तथा मानव मूल्यों का विकास करना ताकि छात्र उन विषयों में अपना चिन्तन तर्कसंगत ढंग से रख सकें;
- संस्कृत ग्रन्थों में उपलब्ध जीवनोपयोगी विषयों के विपुल ज्ञान भण्डार से परिचित कराना जिससे छात्रों में मौलिक चिन्तन की प्रवृत्ति का विकास हो सके तथा प्राप्त ज्ञान को वे अपने मौलिक चिन्तन द्वारा आधुनिक जीवन के सन्दर्भों से जोड़ सकें।

### पाठ्य सामग्री

उपर्युक्त उद्देश्यों की पूर्ति के लिए कक्षा 11 तथा 12 के लिए निम्नलिखित पाठ्यसामग्री होगी :

1. संस्कृत पाठ्यपुस्तक
  2. व्याकरण, छन्द एवं अलंकार की पुस्तक
  3. संस्कृत साहित्य परिचय
  4. संस्कृत लेखन/निबंध (पत्र, लघुकथा, अनुच्छेद लघु निबंध आदि)
- सत्रीकरण-कक्षा 11-12 के पाठ्यक्रम को प्रतिवर्ष दो सत्रों में विभाजित किया गया है।

कक्षा 11 तथा 12 के लिए एन.सी.ई.आर.टी. द्वारा प्रकाशित एक-एक पाठ्यपुस्तक होगी जिसमें 10-10 पाठ होंगे जो दो-दो सत्रों के लिए निर्धारित होंगे जिसमें संस्कृत साहित्य की प्रमुख विधाओं-गद्य, पद्य, नाटक का समावेश होगा। व्याकरण, छन्द एवं अलंकार के लिए एन.सी.ई.आर.टी. द्वारा प्रकाशित एक पृथक् पुस्तक होगी। संस्कृत साहित्य के इतिहास के लिए एक पुस्तक एन.सी.ई.आर.टी. द्वारा प्रकाशित होगी जिसमें संस्कृत वाङ्मय की विविध विधाओं एवं रचनाकारों तथा कृतियों के विषय में जानकारी उपलब्ध होगी।



**विषय-वस्तु**

- पाठ्यपुस्तक में पाठों का संकलन करते समय इस बात का ध्यान रखा जाएगा कि भारत की राष्ट्रीय अखण्डता, भावात्मक एकता, तथा विश्वसंस्कृति के विकास में संस्कृत के योगदान, जीवन के विविध सन्दर्भ, केन्द्रिक घटक, नागरिकों के मूल कर्तव्य तथा जीवन मूल्यों का यथासंभव समावेश हो सके;
- पाठों का संकलन करते समय दोनों कक्षाओं की संस्कृत पाठ्यपुस्तकों में गद्य पद्य एवं नाटक इन तीनों विधाओं का प्रतिनिधित्व होगा;
- संकलित पाठ्यांश सरल, रोचक तथा मानवीय मूल्यों पर आधारित होंगे।

**कक्षा-XI**

पूर्णांक 100

**अंक-विभाजन**

i. पाठ्यपुस्तक	40
ii. लेखक तथा कृति परिचय	10
iii. व्याकरण	30
iv. संस्कृत लेखन अनुवाद तथा पत्र	10
v. अपठित गद्यांश तथा लघु कथा-लेखन	10

कुल अंक 50

**प्रथम सत्र**

(परीक्षा में इन्हीं अंशों से सरलार्थ, सप्रसंग व्याख्या, कथासारांश, प्रश्नोत्तर, उत्तरों के प्रश्न पूछे जाएंगे)।

(अ) पाठ्यांश- निर्धारित पाठ्यपुस्तक के पाँच पाठ 20

निर्धारित पाठ्यपुस्तक : कक्षा 11 के लिए एन.सी.ई.आर.टी. द्वारा प्रकाशित की जाने वाली "संस्कृत पाठ्यपुस्तक"।

(आ) व्याकरण 15

शब्दरूप - अजन्त- (पुल्लिङ्ग) बालक, मुनि, भानु, पितृ, भ्रातृ 5  
(स्त्रीलिङ्ग) लता, मति, धेनु, मातृ  
(नपुंसकलिङ्ग) फल, वारि, मधु

सर्वनाम- तत्, एतत्, किम्, -तीनों लिङ्गों में, अस्मद्, युष्मद्।

संख्यावाची- एक, द्वि, त्रि, चतुर, - तीनों लिङ्गों में।

धातुरूप 5

भू, पठ्, पा (पानार्थक पिब्) गम्, खाद्, स्मृ, पच्, अस्, क्, शक्, प्रच्छ, (पृच्छ्) पत्, नश्, कथ्, चुर, परस्मैपदी पांचों लकारों में।

(लट्, लृट्, लङ् लोट्, विधिलिङ्)

सेव्, लभ्, वृध्, वृत्, रुच्, जन्, (आत्मनेपदी)

पांचों लकारों में।

**कृदन्त प्रत्यय**

क्त्वा, ल्यप्, तुमुन्, क्त, क्तवत्, शातृ, शानच्, तव्यत्, अनीयर्, क्तिन्, ण्वुल्, तृच्, ल्युट्।

अनुशंसित पाठ्यपुस्तक : कक्षा 11 के लिए एन.सी.ई.आर.टी. द्वारा प्रकाशित "व्याकरण सौरभम्" (संशोधित संस्करण)

लेखक परिचय 5

पाठ्यपुस्तक में संकलित पाठों के रचयिताओं का संक्षिप्त परिचय।

लेखन अनुवाद 5

कारकों पर आधारित जिनमें कर्त्ता-क्रिया की अन्विति परिलक्षित हो।

अपठित गद्यांश- पर संस्कृत में प्रश्नोत्तर

राष्ट्रीय, मानवीय एवं नैतिक मूल्यों पर आधारित होगा।

(इसमें उपयुक्त शीर्षक, एक पद में उत्तर, एक वाक्य में उत्तर, विशेषण-विशेष्य की अन्विति, विलोम शब्द, कारक-प्रयोग आदि प्रश्न पूछे जाएंगे)।

द्विती यसत्र कुल अंक 50

(परीक्षा में सरलार्थ, सप्रसंग व्याख्या, सारांश प्रश्नों के उत्तर, उत्तरों के प्रश्न पूछे जाएंगे)।

(अ) पाठ्यांश- निर्धारित पाठ्यपुस्तक के पाँच पाठ- 20

निर्धारित पाठ्यपुस्तक : कक्षा 11 के लिए एन.सी.ई.आर.टी. द्वारा प्रकाशित की जाने वाली 'संस्कृत पाठ्यपुस्तक'।

(आ) व्याकरण 15

तद्धित प्रत्यय त्व, तल्, त्रल्, मतुप्, ठक्, टप्, डीप्, 5

अव्यय पुनः, उच्चैः, नीचैः, शनैः, अधः, चिरम्, नूनम्, पुरा, खलु, मुहुः, भूयः, ह्यः, श्वः, अद्य, अधुना, तूष्णीम्, कुत्र, उपरि, मा, न, च। 4

सन्धि 6

स्वर - दीर्घ, गुण वृद्धि, यण, अयादि। 2

व्यंजन- श्चुत्व, जश्त्व, ष्टुत्व, च-आगम 2

विसर्ग- सत्व, षत्व, णत्व, उत्त्व, रूत्व, लोप्। 2

अनुशंसित पाठ्यपुस्तक : कक्षा 11 के लिए एन.सी.ई.आर.टी. द्वारा प्रकाशित "व्याकरण सौरभम्" (संशोधित संस्करण)

(इ) कृतिपरिचय 5

संकलित पाठों के संदर्भ ग्रन्थों का संक्षिप्त परिचय हिंदी भाषा में/मातृभाषा में।

(ई) संस्कृत लेखन

पत्र- प्रधानाचार्य/अध्यापक को प्रार्थनापत्र/पिता, भाई, मित्र को पत्र/दीपावली, जन्मदिन आदि पर वर्धापन पत्र। 5

लघुकथा लेखन (संस्कृत में)

(प्रदत्त शब्दसूची की सहायता से रिक्तस्थानपूर्ति द्वारा)

अथवा

(संस्कृत में) अनुच्छेद लेखन

(सदाचार, दान, परोपकार, विद्या-महिला, इन्द्रिय-निग्रह, परिश्रम का महत्व आदि विषयों पर आधारित)।



## कक्षा XII

## अंक-विभाजन

पूर्णांक 100

- (i) पाठ्यपुस्तक 40  
 (i) संस्कृत- साहित्य का इतिहास 20  
 (क) चारों वेद तथा प्रमुख उपनिषद् (सामान्य परिचय)  
 रामायण- महाभारत - गीता।  
 (ख) संस्कृत साहित्य परिचय कवि - नाटककार  
 पद्यांश-गद्यांश-नाटक  
 (iii) छन्द 10  
 (iv) अलंकार 10  
 (v) संस्कृत लेखन, लघु निबन्ध 10  
 (vi) समास 5  
 (vii) संस्कृत के लघुवाक्यों में कारकों का प्रयोग 5

## प्रथम सत्र

कुल अंक 50

(परीक्षा में इन्हीं अंशों से सरलार्थ, सप्रसंग-व्याख्या, कथासारांश प्रश्नोत्तर, उत्तरों के प्रश्न पूछे जाएंगे)।

(अ) पाठ्यांश- निर्धारित पाठ्यपुस्तक के पाँच पाठ 20  
 निर्धारित पाठ्यपुस्तक : कक्षा 12 के लिए एन.सी.ई.आर.टी. द्वारा प्रकाशित की जाने वाली "संस्कृत पाठ्यपुस्तक"।

(आ) संस्कृत साहित्य का इतिहास

चारों वेद- उपनिषद्-रामायण-महाभारत-गीता का परिचयात्मक ज्ञान।  
 निर्धारित पाठ्यपुस्तक : एन.सी.ई.आर.टी. द्वारा प्रकाशित 'संस्कृत साहित्य परिचय' (संशोधित संस्करण)।

(इ) छन्द

(लघु, गुरु, गण, यति का प्रयोगात्मक ज्ञान)।

अनुष्टुप् इन्द्रवज्रा, उपेन्द्रवज्रा, उपजाति, वंशस्थ, शार्दूलविक्रीडित, वसन्ततिलका, मालिनी, शिखरिणी, मन्दाक्रान्ता।

(समस्त छन्दों का संस्कृत में लक्षण देकर सोदाहरण लघु, गुरु, मात्रा गाकर स्पष्ट करना)

(ई) समास- (सभी समासों का सामान्य परिचय) 5

अव्ययीभाव, तत्पुरुष, कर्मधारय, द्वन्द्व, द्विगु, बहुव्रीहि।

1. समस्तपदों का विग्रह तथा विग्रह किए गए पदों का समस्तपद बनाना।

2. समासों के नाम से परिचित कराना।

निर्धारित पाठ्यपुस्तक : छन्द और समास के लिए एन.सी.ई.आर.टी. द्वारा प्रकाशित 'व्याकरण सौरभम्' (संशोधित संस्करण)।

(उ) संस्कृत- लेखन (लघु निबन्ध)

(10.15 वाक्य)

## विषय-

1. छात्र के दैनिक जीवन से सम्बन्धित।

2. सदाचार, परोपकार, सत्संगति, दया, दान, मैत्री, धैर्य आदि मानवमूल्यों पर आधारित।

3. वार्षिकोत्सव, पुस्तकालय, महापुरुष-जीवन-वृत्तादि।

4. संस्कृत के प्रमुख ग्रन्थों (रामायण, महाभारत, गीतादि) तथा ग्रन्थकारों (वाल्मीकि, कालिदास, भर्तृहरि आदि) से सम्बन्धित।

## द्वितीय सत्र

कुल अंक 50

(अ) पाठ्यांश- निर्धारित पाठ्यपुस्तक के पाँच पाठ 20  
 निर्धारित पाठ्यपुस्तक : कक्षा 12 के लिए एन.सी.ई.आर.टी. द्वारा प्रकाशित की जाने वाली 'संस्कृत पाठ्यपुस्तक'।

(आ) संस्कृत साहित्य का इतिहास 10

गद्यकाव्यों एवं नाटकों का परिचयात्मक ज्ञान

निर्धारित पाठ्यपुस्तक : एन.सी.ई.आर.टी. द्वारा प्रकाशित 'संस्कृत साहित्य परिचय' (संशोधित संस्करण)।

(इ) अलंकार 10

अनुप्रास, उपमा, यमक, श्लेष, रूपक, उत्प्रेक्षा, अर्थान्तरन्यास, अतिशयोक्ति व्याजस्तुति और अन्योक्ति।

(अलंकारों की परिभाषा देकर सोदाहरण परिचय)

निर्धारित पाठ्यपुस्तक : अलंकार के लिए एन.सी.ई.आर.टी. द्वारा प्रकाशित 'व्याकरण सौरभम्' (संशोधित संस्करण)।

(ई) संस्कृत- लेखन (लघु निबन्ध) 5

(10-15 वाक्य)

## विषय-

(1) छात्र जीवन से सम्बन्धित।

(2) नैतिक मूल्यों पर आधारित।

(3) राष्ट्रीय गतिविधियों पर आधारित।

(उ) लघु वाक्यों में कारकों का प्रयोग 5

(1) कारकों का नियमानुसार वाक्यों में प्रयोग करना।

(2) उपपद विभक्तियों का वाक्यों में प्रयोग।

## शिक्षण-विधि एवं तकनीक

इस स्तर पर संस्कृत शिक्षण को प्रभावी बनाने के लिए अध्यापक छात्र केंद्रित एवं क्रियात्मक विधि का आश्रयण करेंगे जिससे छात्रों में अपेक्षित भाषा कौशलों (श्रवण, वाचन, पठन, लेखन एवं चिंतन) का समुचित विकास हो सके। साथ ही उनमें संस्कृत साहित्य की विविध विधाओं के रसास्वादन की क्षमता विकसित हो सके। अध्यापकों एवं छात्रों द्वारा कक्षा में संस्कृत भाषा का अधिकाधिक व्यवहार वांछनीय है।

## कक्षा-क्रियाकलाप

संस्कृत शिक्षण की प्रक्रिया को रोचक एवं प्रभावी बनाने के उद्देश्य से निम्नलिखित कक्षा-क्रियाकलाप सुझाए जाते हैं, जो अध्यापकों के निदर्शन मात्र के लिए हैं :

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- पद्य पाठों को पढ़ाते समय अध्यापक उनका सस्वर एवं शुद्ध वाचन करें तथा छात्रों से अनुवाचन कराएं (व्यक्तिगत एवं सामूहिक)
- नाट्यांश के पाठों का यथासंभव अभिनय द्वारा अध्यापन को रोचक बनाया जाए।
- गद्य पाठों का शुद्ध वाचन एवं छात्रों द्वारा अनुवाचन कराना अपेक्षित है, जिससे वे गतिपूर्वक किसी भी गद्यांश को पढ़ सकें तथा पठित शब्दों का आत्मविश्वास के साथ प्रयोग कर सकें।
- कक्षा 11-12 की पाठ्यपुस्तकों के पाठ साहित्यिक ग्रंथों से संकलित हैं। अतएव उनमें प्रयुक्त अलंकारों एवं छन्दों को पाठ के साथ ही छात्रों को समझाएं तथा उनका अभ्यास कराएं।
- कक्षा 11-12 के स्तर पर संस्कृत पाठ्यपुस्तक का उद्देश्य संस्कृत साहित्य की विविध विधाओं से छात्रों को अवगत कराना है। अतएव पाठ से सम्बद्ध विधा (गद्य/पद्य/नाटक) एवं ग्रंथ तथा ग्रन्थकार आदि का सांगोपांग परिचय अध्यापक छात्रों को कराएं।
- व्याकरण के निर्धारित अंशों का यथासंभव अभ्यास पाठ पढ़ाते समय छात्रों से कराया जाए, ताकि संस्कृत भाषा के शुद्ध प्रयोग में छात्र दक्ष हो सकें।
- इस स्तर पर व्याकरण के सिद्धांत पक्ष की अपेक्षा इसके व्यवहार पक्ष/प्रयोग पक्ष (अनुप्रयुक्त व्याकरण) पर अधिक बल दें।

- व्याकरण शिक्षण को यथासंभव छात्रों के अभिनय के द्वारा रोचक बनाने का प्रयास किया जाए, ताकि उनमें नीरसता न हो।

### मूल्यांकन

पाठ्यक्रम में निर्धारित पाठ्यपुस्तक, व्याकरण, छन्द, अलंकार एवं संस्कृत साहित्य का इतिहास इत्यादि पाठ्य-सामग्रियों का मूल्यांकन लिखित 80 प्रतिशत एवं मौखिक 20 प्रतिशत किया जाना वांछनीय है। वार्षिक परीक्षा के अतिरिक्त प्रत्येक सत्र के अन्त में सत्रीय मूल्यांकन तथा पाठों के अध्यापन के पश्चात् इकाई परीक्षा अपेक्षित है जिससे छात्रों की विषयगत त्रुटियों को जानकर अध्यापक सुधारात्मक अध्यापन द्वारा यथासमय उन्हें दूर कर सकें।

- मूल्यांकन के प्रश्न विविध प्रकार के हो जैसे-वस्तुनिष्ठ, (अतिलघूत्तरात्मक तथा लघूत्तरात्मक) एवं निबन्धात्मक
- ज्ञान, अर्थग्रहण और अभिव्यक्ति के मूल्यांकन की दृष्टि से प्रश्न होने अपेक्षित हैं
- अध्यापकों द्वारा छात्रों का सतत मूल्यांकन अध्यापन के साथ ही इस प्रकार किया जाना चाहिए कि वह परीक्षा में उत्तीर्ण अथवा अनुत्तीर्ण होने का साधन मात्र न होकर शिक्षण-अधिगम की प्रक्रिया का अभिन्न अंग हो सके।



# संस्कृत (ऐच्छिक)

## (विज्ञान एवं वाणिज्य के छात्रों के लिए)

### भूमिका

संस्कृत भाषा प्राचीन काल से ही भारतीय संस्कृति की अक्षुण्ण परम्परा का आधार एवं व्यापक शिक्षा व्यवस्था की संवाहिका रही है। इसी का परिणाम है कि वैदिक काल से ही संस्कृत में ललित साहित्य के साथ-साथ विविध शास्त्रों का विकास हुआ। तभी से हमें वेद-वेदांतों के साथ-साथ गणित, रसायनशास्त्र, भौतिकशास्त्र, वास्तुशास्त्र, रत्न-विज्ञान, आयुर्वेद, खगोल-विज्ञान, अर्थशास्त्र आदि वैज्ञानिक विषयों के अध्ययन-अध्यापन की परम्परा मिलती है। आधुनिक शिक्षा व्यवस्था में वरिष्ठ माध्यमिक स्तर पर संस्कृत शिक्षण सामान्यतः कला वर्ग तक सीमित हो गया है। फलतः विज्ञान और वाणिज्य के छात्र संस्कृत-ज्ञान-विज्ञान की परम्परा से वंचित रह जाते हैं। अतः आवश्यक है कि सभी भारतीय विद्यार्थियों को संस्कृत की व्यापक वैज्ञानिक चिंतन परम्परा से परिचित कराया जाए। +2 स्तर (कक्षा 11-12) पर विज्ञान और वाणिज्य के विद्यार्थियों के लिए ऐसा पाठ्यक्रम विकसित किया जाए जिससे वे अपने विषय के अनुरूप संस्कृत भाषा का कार्यसाधक ज्ञान प्राप्त कर सकें। अपने विषयों से सम्बद्ध संस्कृत ग्रंथों का परिचय प्राप्त कर सकें और उन ग्रंथों में उपलब्ध मौलिक वैज्ञानिक चिन्तन से परिचित हो सकें। इस स्तर पर छात्रों की आवश्यकता को ध्यान में रखते हुए प्रस्तावित पाठ्यक्रम के शैक्षिक उद्देश्यों को निम्नलिखित रूप में परिगणित किया जा रहा है :

### सामान्य उद्देश्य

- संस्कृत भाषा का व्यावहारिक ज्ञान प्राप्त कराना;
- विज्ञान और प्रौद्योगिकी के क्षेत्र में प्राचीन मनीषियों (आर्यभट्ट, चाणक्य एवं वराहमिहिर आदि) के भारतीय मौलिक चिन्तन एवं विशिष्ट योगदान से छात्रों को परिचित कराना एवं छात्रों में राष्ट्रीय गौरव की भावना का विकास करना;
- विश्व सभ्यता व संस्कृति के विकास में संस्कृत वाङ्मय के योगदान से परिचित कराना;
- भारतीय वैज्ञानिक तथा वाणिज्यिक परम्परा के परिचय द्वारा छात्रों में तद्विषयक मौलिक चिन्तन का विकास करना;
- संस्कृत-वाङ्मय में निहित मानवीय मूल्यों के परिप्रेक्ष्य में वैज्ञानिक एवं वाणिज्यिक प्रगति के प्रति छात्रों में समन्वयात्मक एवं सकारात्मक दृष्टिकोण विकसित करना।

### विशिष्ट उद्देश्य

- छात्रों में स्तर के अनुरूप संस्कृत भाषा की व्यावहारिक योग्यता उत्पन्न करना;
- छात्रों में संस्कृत के श्रवण, भाषण, पठन और लेखन भाषा कौशल को विकसित कराना;
- छात्रों को संस्कृत-वाङ्मय में निहित भारतीय वैज्ञानिक तथा वाणिज्यिक शब्दावली एवं शैली से परिचित कराना;
- संस्कृत के मूल वैज्ञानिक तथा वाणिज्यिक पाठ्यांशों का अपनी भाषा में रूपान्तरण करने की क्षमता उत्पन्न करना;
- निर्धारित पाठ्यसामग्री पर आधारित प्रश्नों के उत्तर संस्कृत में देने की क्षमता उत्पन्न करना;
- सम्बद्ध विषयों के साथ पठित सामग्री की तुलना कर अपने मौलिक चिन्तन द्वारा उसे आधुनिक संदर्भों से जोड़ने की क्षमता उत्पन्न करना;
- संस्कृत-वाङ्मय में निहित राष्ट्रीय भावनाओं तथा मानवमूल्यों का विकास करना;
- संस्कृत-वाङ्मय के वैज्ञानिक तथा वाणिज्यिक ज्ञान की समीक्षात्मक सराहना करने की क्षमता उत्पन्न कर सकना।

### पाठ्यक्रम एवं पाठ्य सामग्री

उपर्युक्त उद्देश्यों की पूर्ति के लिए कक्षा 11 तथा 12 के लिए निम्नलिखित पाठ्यसामग्री होगी-

(1. संस्कृत पाठ्यपुस्तक 2. संस्कृत के वैज्ञानिक अथवा वाणिज्यिक साहित्य का इतिहास)

सत्रीकरण-कक्षा 11-12 का पाठ्यक्रम प्रतिवर्ष दो सत्रों में विभाजित है।

कक्षा 11 तथा 12 के लिए एन.सी.ई.आर.टी. द्वारा प्रकाशित एक-एक पाठ्यपुस्तक होगी, जिसमें 10-11 पाठ हो सकते हैं, जो प्रत्येक कक्षा के दोनों सत्रों के लिए निर्धारित होंगे।

- पाठ्यपुस्तक में मूल्यप्रधान श्लोक, साहित्यिक पाठ, वैज्ञानिक पाठ तथा वाणिज्यिक पाठों का समावेश होगा
- पाठ्यपुस्तकों में पाठों का संकलन करते समय इस बात का ध्यान रखा जाएगा कि भारत की राष्ट्रीय अखण्डता, भावात्मक एकता तथा विश्वसंस्कृति के विकास में संस्कृत के योगदान, जीवन के विविध



संदर्भ, चैतन्य पाठकों, पाठनिकों के मूल कलात्मक तथा जीवन-मूल्यों का यथासंभव सम्बन्ध हो सके।

### अंक-विभाजन

I. पाठ्यपुस्तक	- 75% अंक
क. भाषिकतात्मक	- 25%
ख. विषय वस्तु	- 50%
II. संस्कृत के वैज्ञानिक अथवा वाणिज्यिक साहित्य का इतिहास	- 25%

### संदर्भ योग्यताएँ

इस पाठ्यक्रम में कक्षा 11-12 उत्तीर्ण होने पर छात्रों में निम्नलिखित संदर्भ योग्यताएँ विकसित होंगी :

- संस्कृत भाषा का व्यवहारिक ज्ञान प्राप्त होगा। (चारों भाषाकौशल-सुनना, बोलना, पढ़ना एवं लिखना में स्तरानुसार दक्षता होगी।)
- विज्ञान एवं प्रौद्योगिकी के क्षेत्र में प्राचीन भारतीय मनीषियों (आर्यभट्ट, ब्रह्मगुप्त, चाणक्य आदि) के मौलिक चिन्तन एवं विशिष्ट योगदान से परिचित हो सकेंगे तथा उनमें राष्ट्रीय गौरव की भावना का विकास होगा।
- संस्कृत परम्परा में सुरक्षित मानव मूल्यों (विश्ववन्द्य आदि) राष्ट्रीय मूल्यों (राष्ट्रियता, देशभक्ति, विविधता में एकता, राष्ट्रीय अखण्डता आदि) तथा नैतिक मूल्यों का छात्रों में विकास हो सकेगा।
- विश्व सभ्यता एवं संस्कृति के विकास में संस्कृत वाङ्मय के योगदान से परिचित हो सकेंगे।
- भारतीय वैज्ञानिक तथा वाणिज्यिक परम्परा के परिचय द्वारा छात्रों में तद्विषयक मौलिक चिन्तन का विकास हो सकेगा।

### शिक्षण-विधि एवं तकनीक

इस स्तर पर संस्कृत शिक्षण को प्रभावी एवं रोचक बनाने के लिए अध्यापकों द्वारा छात्र-केन्द्रित एवं क्रियात्मक विधि का आश्रय लिया जाना वांछनीय है। संस्कृत भाषा के व्यावहारिक ज्ञान में छात्रों को दक्ष बनाने के लिए संस्कृत भाषा का अधिकाधिक मौखिक व्यवहार एवं अभ्यास कराया जाना अपेक्षित है। भाषा ज्ञान कराते समय व्याकरण को जटिलता में डाला बिना केवल व्यवहार एवं प्रयोग द्वारा छात्रों को संस्कृत भाषा के व्यवहार में दक्ष किया जाना वांछनीय है।

### कक्षा क्रिया-कलाप

- पद्य पाठों को पढ़ते समय अध्यापक उसका शुद्ध एवं सस्वर वाचन

करे तथा छात्रों से अनुवाचन कराए (व्यक्तिगत एवं सामूहिक)।

- गद्य पाठों का शुद्ध वाचन एवं छात्रों द्वारा अनुवाचन कराया अपेक्षित है जिससे वे आत्मविश्वासपूर्वक संस्कृत गद्यांश को उचित गति के साथ शुद्ध रूप में पढ़ सकें।
- पाठों में प्रयुक्त व्याकरण के तात्त्विक औखिक व्यवहार एवं प्रयोग द्वारा सड़न डंग से छात्रों को संस्कृत भाषा में दक्ष बनाने का प्रयास करें तथा इसके लिए प्रेरित करें कि छात्र परस्पर संस्कृत में चर्चा-लाप करें।
- कक्षा 11-12 के इस पाठ्यक्रम का उद्देश्य संस्कृत वाङ्मय में निहित प्राचीन भारतीय वैज्ञानिकों के विशिष्ट योगदान से छात्रों को अवगत कराना है। अतएव पाठों को पढ़ते समय सम्बन्ध वैज्ञानिक विषय (आयुर्वेद, गणित, खगोलशास्त्र, भौतिकशास्त्र इत्यादि) तथा ग्रंथ एवं ग्रंथकार का सामान्य परिचय अध्यापक छात्रों को प्रस्तुत करें तथा उसके अवबोध की परीक्षा के लिए लिखित गृह कार्य दें।
- विज्ञान प्रौद्योगिकी एवं वाणिज्यशास्त्र के क्षेत्र से प्राचीन भारतीय मनीषियों के मौलिक चिन्तन एवं विशिष्ट योगदान से सम्बन्ध विषय पर कक्षा में कभी-कभी 'विचार' आदि प्रतियोगिता का आयोजन करना लाभप्रद होगा।
- जीवन मूल्यों से सम्बन्ध पाठ पढ़ते समय छात्रों में उनके समुचित विकास के लिए समुचित प्रेरणा दें।

### मूल्यांकन

पाठ्यक्रम में निर्धारित पाठ्यपुस्तक एवं संस्कृत के वैज्ञानिक अथवा वाणिज्यिक साहित्य का इतिहास इत्यादि पाठ्य-सामग्रियों का मूल्यांकन लिखित 80 प्रतिशत एवं मौखिक 20 प्रतिशत जाना वांछनीय है। वार्षिक परीक्षा के अतिरिक्त प्रत्येक सत्र के अन्त में सत्रांत मूल्यांकन तथा पाठों के अध्यापन के पश्चात् इकाई परीक्षा अपेक्षित है जिससे छात्रों की विषयगत त्रुटियों को जानकर अध्यापक सुधारात्मक अध्यापन द्वारा यथासमय उन्हें दूर कर सकें।

- मूल्यांकन के प्रश्न विविध प्रकार के हों जैसे-वस्तुनिष्ठ, (अति-लघूत्तरात्मक तथा लघूत्तरात्मक) एवं निबन्धात्मक;
- ज्ञान, अर्थग्रहण और अभिव्यक्ति के मूल्यांकन की दृष्टि से प्रश्न होने अपेक्षित हैं;
- अध्यापकों द्वारा छात्रों का सतत मूल्यांकन अध्यापन के साथ ही इस प्रकार किया जाना चाहिए कि वह परीक्षा में उत्तीर्ण अथवा अनुत्तीर्ण होने का साधन मात्र न होकर शिक्षण-अधिगम की प्रक्रिया का अभिन्न अंग हो सके।



# English (Core)

## Rationale

Students are expected to have acquired the basic language skills in English by the time they come to Class XI and the course will aim, essentially, to promote the higher-order language skills as well as the skills of thinking.

For a large number of students, the higher secondary stage will be a preparation for the University, where a fairly high degree of proficiency in English may be required. But for another large group, the higher secondary stage may be a preparation for entry into the world of work. The Core Course should cater to both groups by promoting the language skills required for academic study at the tertiary level as well as the language skills required for the workplace.

## The Structure of the Curriculum

The English curriculum for Classes XI and XII shall consist of:

1. a Core Course, which shall be mainly functional and shall be compulsory for all students, and
2. an Elective Course in English Language and Literature.

Semesterisation is recommended for this course. The entire course will be divided into four semesters. The first and second semesters will be covered in Class XI and the third and fourth semesters in Class XII.

## CLASS XI

### The Curricular Package

The curricular package for the Core Course (XI) shall consist of:

1. a Course Book, containing language texts in different genres for intensive study, together with exercises. 10 prose pieces and 5 poems are to be studied.
2. a Workbook containing exercises based on the prescribed texts as well as "unseen" texts, together with writing activities and exercises on grammar and phonology.

3. a Supplementary Reader containing 8 texts, in different genres, for "non-detailed" study.

Fifty per cent of the Course Book along with the corresponding activities in the Workbook and Fifty per cent of the Supplementary Reader (Class XI) will be covered in the first semester and the remaining in the second semester.

### Learning Outcomes

(Learning Outcomes are stated in terms of competencies that students will require to perform specific language tasks.)

#### Listening

- listening to and comprehending live as well as recorded oral presentations on a variety of topics
- listening to oral instructions in order to perform a given task (e.g., using a map to arrive at a destination, following directions given orally).  
(The skills of Listening will be taught and tested through specially prepared recorded material.)

#### Speaking

- taking part in group discussions/interviews
- making short oral presentations on given topics
- other need-based functional activities requiring oral communication

#### Intensive Reading

- reading and comprehending unsimplified texts of 500-750 words and guessing the meanings of unfamiliar words from the context
- perceiving the over-all meaning and organisation of the text (i.e., the relationships of the different "chunks" in the text to each other)
- identifying the central/main point and supporting details, etc.
- locating specific items of information
- making predictions about future events, developments, etc.



**Extensive Reading**

- reading and comprehending extended texts of at least 20 pages in the following genres: fiction, science fiction, drama, poetry, biography, autobiography, travel and sports literature, in abridged or original form.

**Writing**

- text-based writing (i.e., writing in response to questions or tasks based on prescribed or unseen texts)
- expository/argumentative essays of 250-500 words, explaining or developing a topic, arguing a case, etc.
- formal/informal letters and applications for different purposes
- writing related to the workplace (minutes, memoranda, notices, summaries, reports; filling up of forms, preparing bio-data, CVs, e-mail messages, etc.).

**Study skills**

- taking/making notes from reference materials, recorded talks etc.

**Thinking skills**

- the activities used to promote the advanced language skills will also aim to develop the skills of reasoning, drawing inferences, etc.

**Grammar and Phonology**

The study of formal (descriptive) grammar, at a very elementary level, will be introduced in Class XI. The Workbook for the Core Course will contain suitable exercises on grammar as well as phonology. (For phonology, students will require some theoretical knowledge to enable them to consult a pronouncing dictionary)

Students will be introduced to basic concepts in the phonology of English (syllable division, stress intonation, and segmental sounds) so that they may be able to consult a pronouncing dictionary when required. The Workbook will contain suitable exercises for this purpose.

**CLASS XII****The Curricular Package**

The curricular package for the Core Course (XII) shall consist of :

1. a Course Book, containing language texts in different genres for intensive study, together

with exercises. 10 prose pieces and 5 poems are to be studied in each year of the course.

2. a Workbook containing exercises based on the prescribed texts as well as "unseen" texts, together with writing activities and exercises on grammar and phonology.
3. a Supplementary Reader containing 8 texts, in different genres, for "non-detailed" study.

Fifty per cent of the Course Book along with the corresponding activities in the Workbook and Fifty per cent of the Supplementary Reader (Class XII) will be covered in the third semester and the remaining in the fourth semester.

**Learning Outcomes**

In addition to the skills indicated for Class XI, the Core Course for Class XII will aim to develop the following skills:

**Listening**

- understanding oral communication without face-to-face interaction (e.g. telephonic conversations/messages, etc.)
- understanding nuances conveyed through stress and intonation.

**Speaking**

- presenting oral reports on planned events, projects, etc.
- communicating nuances through stress and intonation.

**Intensive Reading**

- understanding how cohesive devices help to link the parts of the text
- identifying and responding to the tone of a written text (i.e., opinions and attitudes which may be implied but not stated explicitly)
- converting verbal information present in a text into tabular or diagrammatic form, decoding information.

**Writing**

- Writing simple project proposals and reports, as an introduction to research.

**Study Skills and Thinking Skills**

- The activities used to promote the advanced language skills will also aim to develop the skills of reasoning, making inferences, etc.



## Grammar and Phonology

Students opting for the Core Course will be introduced to the study of English Grammar and Phonology. It is recommended that a textbook, based on a suitable pedagogical model, be prepared for use at this level. Meanwhile, the teaching of grammar and phonology can be done with the help of the Workbook as well as available textbooks.

Students will be introduced to basic concepts in the phonology of English so that they will be able to consult a pronouncing dictionary when required. The Workbook will contain suitable exercises for this purpose.

## Course Content (Core Course XI-XII)

The course content will be provided through the texts selected for study as well as the activities/exercises used for learning. *The thematic package is merely suggestive and should be in line with the learners' life experiences and interests.*

## Thematic Content

The need for strengthening national identity is being felt now much more than ever before. As such there is a strong plea for promoting national integration, and social cohesion by cultivating values as enshrined in the Constitution of India through school curriculum. With this in view, the ten core components identified in the National Policy on Education, 1986 need to be reaffirmed. They are as follows: The history of India's freedom movement, the Constitutional obligations; the content essential to nurture national identity; India's common cultural heritage; egalitarianism, democracy and secularism; equality of sexes; protection of the environment; removal of social barriers; observance of the small family norm; and inculcation of scientific temper.

The Fundamental Duties as laid down in Article 51A of Part IVA of the Indian Constitution, also have to be included in the core components. These are to: (a) abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem; (b) cherish and follow the noble ideals which inspired our national struggle for freedom; (c) uphold and protect the sovereignty, unity and integrity of India; (d) defend the country and render national service when called upon to do so; (e) promote harmony and the spirit of common brotherhood among all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of woman;

(f) value and preserve the rich heritage of our composite culture; (g) protect and improve the natural environment including forests, lakes, rivers, wild life and to have compassion for the living creatures; (h) develop the scientific temper, humanism and the spirit of enquiry and reform; (i) safeguard public property and abjure violence, and (j) strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement.

These core components need to be integrated in school curriculum in a suitable manner. It is envisaged that they would help in instilling a nationally shared perception and values and creating an ethos and value system in which a common Indian identity could be strengthened.

The syllabi and materials must create and sustain among the learners a sense of patriotism, pride in being Indian and promote international understanding. In order to achieve these the materials will have to:

- highlight the country's strength and potential in different fields;
- make a balanced presentation of India's achievements and the achievements of other countries. Scientific, technological, cultural and spiritual glory of India's past must be highlighted;
- acquaint learners with contributions of India and Indians in various fields in the past and in the present;
- develop awareness and understanding about indigenous knowledge in various fields with their implication to modern times; and
- strengthen the love for the country by highlighting the efforts and sacrifices made by all sections of the Indian society in the freedom struggle.

Since all the contemporary concerns and issues cannot be included in the school curricula as separate subjects of study, relevant concerns like conservation and improvement of environment, conservation of resources, population concerns, disaster management education, adolescence education, forestry, value inculcation, human rights and fundamental duties, neighbourhood education, migration education, family life education, safety education, consumer education and education for sustainable development must be suitably incorporated in relevant subject areas at appropriate stages. Similarly, in science and technology



domain, due place must be accorded to non-conventional but highly relevant scientific topics necessary for meaningful study of other subjects like earth sciences, bio-technology etc. at suitable points in the main curricula.

### Sub-themes

#### 1. Personal relationships

##### **Self, the Family and Home; Friends and Pets**

Family relationships and roles (kinship terms)  
Responsible parenthood  
Family values (respect for elders, etc.)  
Family routines, special occasions (festivals etc.) Friends (togetherness)  
Animals as friends  
Gender equality and equity.

#### 2. The Neighbourhood

Neighbourhood personalities Occupations and professions Social diversity; different languages, religions, customs, etc. the values of social cohesion and harmonious living.

#### 3. The Larger Community

The state/region  
The land and the people  
Geography and natural resources,  
Sustainable development  
History and legends.

#### 4. The Nation

People – rural, tribal, deprived and challenged, places and customs  
India's history, myths and legends  
Cultural diversities  
Famous Indians  
India's contribution to world civilization, pride in being an Indian, India's freedom movement.

#### 5. The World Beyond

India's neighbours; lands, peoples, cultures, cultural exchanges between India and other countries,  
Place and the value of international understanding,  
Tales from other lands.

#### 6. The World of Adventure

Travellers and explorers  
Acts of bravery, courage and endurance.

#### 7. The World of Sports and Health Education

The value of games and sports  
Famous sportspersons like Malleshwari, Gopichand  
Stories from the sports arena, interesting hobbies e.g. bungee jumping, sky diving  
Alternative systems of medicine like Reiki and Ayurveda.

#### 8. Health with special reference to Adolescence Reproductive Health

Process of growing up  
HIV/Aids Education against drug abuse.

#### 9. The World of Nature

Our environment and its protection  
The wonders of nature Oceans, mountains, rivers  
The mysteries of the sea  
The animal and plant kingdoms  
Life in pre-historic times; the dinosaurs,  
Natural disasters; man versus nature

#### 10. The World of Science and Technology

Science in everyday life  
Discoveries and inventions that have changed the world  
Communication; Information Technology  
Famous scientists  
Looking into the future – genetic engineering, cloning.

#### 11. The World of Imagination

Science fiction, mysteries  
The supernatural; ghost stories  
Fantasies

While developing the above themes the following genres will be used—short stories, plays, biographies, letters, speeches, poems, travelogues, essays, myths and legends and pages from diaries.

At the higher secondary level, students should be exposed to literary as well as non-literary texts which sensitize them to different social, philosophical and cultural issues and values, such as love for nature and the environment, the world of imagination, relationships across genders, etc. A range of suitable themes has been suggested in the syllabus. Material producers are expected to choose appropriate themes from the list provided.

#### Grammatical and Lexical Content

The choice of grammatical structures/patterns and lexical items will be determined by the the-



matic content of the texts. Although strict grammatical and lexical control cannot be exercised, the language of the selected texts should, in general, be geared to the expected linguistic attainments of students.

Particular attention may, however, be given to the following areas of grammar :

- the uses of different tense forms for different kinds of narration (e.g. media commentaries, reports, programmes, etc.)
- the use of passive forms in scientific writing (describing processes, etc.)
- converting one kind of sentence/clause structure into a different kind of structure, to introduce stylistic variation)
- modal auxiliaries.

### Methods and Techniques

The techniques used for teaching should promote habits of self-learning and reduce dependence on the teacher. In general, we recommend a **"multi-skill, learner-centred, activity-based"** approach, of which there can be many variations. The Core classroom activity is likely to be that of silent reading of prescribed/selected texts for comprehension, which can lead on to other forms of language learning activity such as role-play, dramatization, group discussion, writing, etc. (although many such activities can be carried out without the preliminary use of textual material). It is important that students be trained to read independently and intelligently, interacting actively with texts, with the use of reference materials (dictionaries, thesauruses, etc.) where necessary. Some pre-reading activity will generally be required, and the course books should suggest suitable activities,

leaving teachers free to devise other activities when desired. So also, the reading of texts should be followed-up by post reading activities. It is important to remember that every text can generate different readings; students should be encouraged to interpret texts in different ways.

Group and pair activity can be resorted to when desired, but many useful language activities can be carried out individually.

In general, teachers should encourage students to interact actively with texts and with each other. Oral activity (group discussion, etc.) should be encouraged.

### Time Allocation

The following allotment of periods is recommended: 6-7 periods a week.

### Evaluation

Since Semesterisation is recommended, the two year course should be divided into four semesters. Grades / marks for the first three semesters should be given a weightage for the final examination. In each semester Forty per cent of the marks should be allocated for continuous assessment, whereas the final examination should carry a weightage of Sixty per cent.

Ten per cent of the marks for continuous assessment should be allocated for each skill.

For the final examination at the end of each semester Twenty per cent of the marks should be allocated for the oral skills (Listening and Speaking) and Forty per cent for reading and writing.

Continuous evaluation will be done through assignments and projects, and listening will be tested through cassettes and the electronic mass media.







# English (Elective)

## Rationale

The elective course will cater to students desiring a more challenging course in Language and Literature, as a preparation for the specialized study of English at the university, as well as to students wanting to join Teacher Education courses to become teachers of English. The course will provide extensive exposure to a variety of writings in English, including classics in abridged form, and develop sensitivity to the creative and imaginative uses of English.

Students opting for this course will be expected to have attained a reasonable mastery over the essentials of the English language, i.e., they would have an active vocabulary of at least 4000 – 5000 words, and would have acquired the ability to use the basic grammatical patterns. The course will therefore be pitched at a level which the student can find challenging. This can be achieved through exposure to rich literary texts of world literature as well as by Indian writers, which will help students to develop sensitivity to the imaginative and creative uses of language and give them a taste for reading with discrimination.

Students will be required to translate from mother tongue to English. Translation may be of about 500 words, factual and / or literary passages taken from texts and / or from newspapers, magazines etc. This exercise will give the students an insight into writing/s in the regional language/s.

Semesterisation is recommended for this course. The entire course will be divided into four semesters. The first and second semesters will be covered in Class XI and the third and fourth semesters in Class XII.

## The Curricular Package

The curricular package for Class XI (Elective Course) shall consist of :

### Semester I

1. An Anthology of Short Stories for intensive study, together with exercises.
2. A book containing exercises based on the

prescribed texts as well as “unseen” texts, together with writing activities.

### Semester II

3. An Anthology of Poems.
4. A Short Novel (about 100 pages).

The curricular package for Class XII (Elective Course) shall consist of :

### Semester III

5. A Short Contemporary Novel.
6. A Collection of Contemporary One Act Plays.

### Semester IV

7. A Book of Grammar and Phonology.
8. An Anthology of Prose.

## Learning Outcomes

(Learning Outcomes are stated in terms of competencies that students will require to perform specific language tasks.)

### Listening

- listening to and comprehending live as well recorded oral presentations on a variety of topics
  - listening to oral instructions in order to perform a given task (e.g., using a map to arrive at a destination, following directions given orally).
- (The skills of Listening will be taught and tested through specially prepared recorded material.)

### Speaking

- taking part in group discussions/interviews
- making short oral presentations on given topics
- recitation, story telling.

### Intensive Reading

Reading and comprehending unsimplified texts of about 1000 words

- guessing the meanings of unfamiliar words from the context



- perceiving the over-all meaning and organisation of the text (i.e., the relationships of the different "chunks" to each other) identifying the central/main point and supporting details, etc. locating specific items of information
- making predictions about future events, developments, etc.
- locating specific items of information
- identifying the central / main points and supporting details etc.
- appreciating stylistic nuances and analyzing a variety of texts
- understanding the main and the sub themes and correlating them.

#### Extensive Reading

- Reading and comprehending extended texts of at least 20 pages in the following genres: fiction, science fiction, drama, poetry, biography, autobiography, travel and sports literature, in abridged or original form.

#### Writing

- text-based writing (writing in response to questions or tasks based on prescribed as well as "unseen" texts)
- expository / argumentative essays of 250-500 words, explaining or developing a topic, arguing a case, etc.
- formal/informal letters and applications for different purposes
- writing academic papers, project reports etc. as a form of introduction to research
- writing related to the work-place (drafts of minutes, memoranda, reports, etc.)
- research-related writing (elementary research reports, etc.)
- creative writing – completion of a story.

#### Study Skills

- Taking/making notes from reference materials and recorded talks.

#### Thinking Skills

- The activities used to promote the advanced language skills will also aim to develop the skills of reasoning, making inferences, etc.

#### Grammar and Phonology

Students opting for the Elective Course will be

introduced to the study of English Grammar and Phonology and its uses at a more advanced level than for the Core Course. It is recommended that a textbook, based on a suitable pedagogical model, be prepared for use at this level. Meanwhile, the teaching of grammar and phonology can be done through the Workbook as well as available textbooks.

Students will be introduced to basic concepts in the phonology of English (syllable division, stress and segmental sounds, besides intonation, strong and weak forms) so that they will be able to consult a pronouncing dictionary when required. The Workbook will contain suitable exercises for this purpose.

#### Course Content (Elective Course XI-XII)

The course content will be provided through the texts selected for study as well as the activities/exercises used for learning. *The thematic package is merely suggestive and should be in line with the learners' life experiences and interests.*

#### Thematic Content

The need for strengthening national identity is being felt now much more than ever before. As such there is a strong plea for promoting national integration, and social cohesion by cultivating values as enshrined in the Constitution of India through school curriculum. With this in view, the ten core components identified in the National Policy on Education, 1986 need to be reaffirmed. They are as follows: The history of India's freedom movement; The Constitutional obligations; the content essential to nurture national identity; India's common cultural heritage; egalitarianism, democracy and secularism; equality of sexes; protection of the environment; removal of social barriers; observance of the small family norm; and inculcation of scientific temper.

The Fundamental Duties as laid down in Article 51A of Part IVA of the Indian Constitution, also have to be included in the core components. These are to: (a) abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem; (b) cherish and follow the noble ideals which inspired our national struggle for freedom; (c) uphold and protect the sovereignty, unity and integrity of India; (d) defend the country and render national service when called upon to do so; (e) promote harmony and the spirit of common brotherhood among all the people of India transcending religious, linguistic



and regional or sectional diversities; to renounce practices derogatory to the dignity of woman; (f) value and preserve the rich heritage of our composite culture; (g) protect and improve the natural environment including forests, lakes, rivers, wild life and to have compassion for the living creatures; (h) develop the scientific temper, humanism and the spirit of enquiry and reform; (i) safeguard public property and abjure violence, and (j) strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement.

These core components need to be integrated in school curriculum in a suitable manner. It is envisaged that they would help in instilling a nationally shared perception and values and creating an ethos and value system in which a common Indian identity could be strengthened.

The syllabi and materials must create and sustain among the learners a sense of patriotism, pride in being Indian and promote international understanding. In order to achieve these the materials will have to:

- a) highlight the country's strength and potential in different fields;
- b) make a balanced presentation of India's achievements and the achievements of other countries. Scientific, technological, cultural and spiritual glory of India's past must be highlighted;
- c) acquaint learners with contributions of India and Indians in various fields in the past and in the present;
- d) develop awareness and understanding about indigenous knowledge in various fields with their implication to modern times; and
- e) strengthen the love for the country by highlighting the efforts and sacrifices made by all sections of the Indian society in the freedom struggle.

Since all the contemporary concerns and issues cannot be included in the school curricula as separate subjects of study, relevant concerns like conservation and improvement of environment, conservation of resources, population concerns, disaster management education, adolescence education, forestry, value inculcation, human rights and fundamental duties, neighbourhood education, migration education, family life education, safety education, consumer education and education for

sustainable development must be suitably incorporated in relevant subject areas at appropriate stages. Similarly, in science and technology domain, due place must be accorded to non-conventional but highly relevant scientific topics necessary for meaningful study of other subjects like earth sciences, bio-technology etc. at suitable points in the main curricula.

## Sub-themes

### 1. Personal Relationships

#### ***Self, the Family and Home; Friends and Pets,***

Family relationships and roles (kinship terms),

Responsible parenthood,

Family values (respect for elders, etc.),

Family routines, special occasions (festivals etc.),

Friends (togetherness),

Animals as friends,

Gender equality and equity

### 2. The Neighbourhood

Neighbourhood personalities,

Occupations and professions

Social diversity; different languages, religions, customs, etc. the values of social cohesion and harmonious living

### 3. The Larger Community

The state/region,

the land and the people,

geography and natural resources,

sustainable development,

history and legends

### 4. The Nation

People – rural, tribal, deprived and challenged, places and customs,

India's history, myths and legends,

Cultural diversities,

Famous Indians,

India's contribution to world civilization,

pride in being an Indian,

India's freedom movement

### 5. The World Beyond

India's neighbours, lands, peoples, cultures, cultural exchanges between India and other countries, place and the value of international understanding,

Tales from other lands



**6. The World of Adventure**

Travellers and explorers,  
Acts of bravery, courage and endurance

**7. The World of Sports and Health Education**

The value of games and sports,  
Famous sportsmen like Malleshwari,  
Gopichand,  
Stories from the sports arena, interesting  
hobbies, e.g. bungee jumping, sky diving,  
Alternative systems of medicine like Reiki  
and Ayurveda

**8. Health with special reference to adolescence reproductive health**

Process of growing up,  
HIV/Aids,  
Education against drug abuse

**9. The World of Nature**

Our environment and its protection,  
The wonders of nature,  
Oceans, mountains, rivers,  
The mysteries of the sea,  
The animal and plant kingdoms,  
Life in pre-historic times, the dinosaurs,  
Natural disasters; man versus nature

**10. The World of Science and Technology**

Science in everyday life,  
Discoveries and inventions that have  
changed the world,  
Communication, Information Technology,  
Famous scientists,  
Looking into the future – genetic engineering,  
cloning, etc.

**11. The World of Imagination**

Science fiction, mysteries,  
The supernatural, ghost stories,  
Fantasies

While developing the above themes the following genres will be used—short stories, plays, biographies, letters, speeches, poems, travelogues, essays, myths and legends and pages from diaries.

At the Higher Secondary level, students should be exposed to literary as well as non-literary texts which sensitize them to different social, philosophical and cultural issues and values, such as love for nature and the environment, the world of imagination, relationships across genders, etc. Self esteem, secularism, fundamental duties, fundamental rights, cultural heritage of our country are some of the areas to be given special attention. A

range of suitable themes has been suggested in the syllabus. Material producers are expected to choose appropriate themes from the list provided.

**Grammatical and Lexical Content**

The choice of grammatical structures/patterns and lexical items will be determined by the thematic content of the texts. Although strict grammatical and lexical control cannot be exercised, the language of the selected texts should, in general, be geared to the expected linguistic attainments of students.

Particular attention may, however, be given to the following areas of grammar :

- i. the uses of different tense forms for different kinds of narration (e.g. media commentaries, reports, programmes, etc.)
- ii. the use of passive forms in scientific writing (describing processes, etc.)
- iii. converting one kind of sentence/ clause structure into a different kind of structure, to introduce stylistic variation)

**Methods and Techniques**

The techniques used for teaching should promote habits of self-learning and reduce dependence on the teacher. In general, we recommend a “**multi-skill, learner-centred, activity-based**” approach, of which there can be many variations. The “Elective” classroom activity is likely to be that of silent reading of prescribed/selected texts for comprehension, which can lead on to other forms of language learning activity such as role-play, dramatization, group discussion, writing, etc. (although many such activities can be carried out without the preliminary use of textual material). It is important that students should be trained to read independently and intelligently, interacting actively with texts, with the use of reference materials (dictionaries, thesauruses, etc.) where necessary. Some pre-reading activity will generally be required, and the course-books should suggest suitable activities, leaving teachers free to devise other activities when desired. So also, the reading of texts should be followed-up by post-reading activities. It is important to remember that every text can generate different readings; students should be encouraged to interpret texts in different ways. Presenting the views of critics on a literary text and expressing his/her reactions to them. Some project work may be assigned to students. They may be asked to collect a few lyrics or stories on a



similar theme from English and regional language/ literature, etc.

Group and pair activity can be resorted to when desired, but many useful language activities can be carried out individually.

In general, teachers should encourage students to interact actively with texts and with each other. Oral activity (group discussion, etc.) should be encouraged.

### **Time Allocation**

The following allotment of periods is recommended: 8-9 periods a week.

### **Evaluation**

Since Semesterisation is recommended, the two

year course should be divided into four semesters. Grades / marks for the first three semesters should be given a weightage for the final examination. In each semester Forty per cent of the marks should be allocated for continuous assessment, whereas the final examination should carry a weightage of sixty per cent. For the final examination Five per cent would be allocated for listening and Ten per cent for speaking (presentation of a report, talk, book review, project report etc.) Forty five per cent would be allocated for reading and writing. Continuous evaluation will be done through assignments and projects, and listening will be tested through cassettes and the electronic mass media.

HISTORY







# History

As part of general education the two years of secondary stage oblige at leastening the study of courses in a few subjects of choice. This stage is very significant both as a final stage of school education enabling the child to enter life and as a preparatory stage enabling him/her to pursue higher academic studies in a few selected subjects. It is observed that a large percentage of students cease their formal education at the end of this stage. A large number join the world of work. A significant number of primary school teachers come from among those who have completed their formal schooling at this stage. In other words, higher secondary stage is a very crucial stage of education in the school system as a whole.

The first ten years of schooling constitute a significant part of the total school education and general education. It is time at which the child acquires some of the main trends and developments in the history of India and of the world. Keeping the requirements of general education in view, the components of history in story-telling form are incorporated in environmental studies at the primary stage from Classes II to V and some more elements are integrated in social science from Class VI to X.

History as an independent discipline will be introduced at the higher secondary stage. The pupil is initiated into a systematic study of the subject for the first time and introduced to the methods of the discipline.

The foundation for studying history steadily laid at the elementary level at the upper primary and secondary stages would have to be strengthened at the higher secondary stage. The courses may be developed in a way to enable the pupil to pursue an advanced course in history. Further, some knowledge of the broad trends in the history of the world would enable the pupil to study the developments in India as well as in other countries. The overall perspective of world development. Doubt, the study of Indian history should be

given adequate attention and the courses devoted to this stage will not be extensive in Indian history.

Then it is proposed that the study of Indian History may be a compulsory part of the course at this stage. Simultaneously there would be optional courses related to specific aspects and periods of Indian history, such as the history of ancient, early medieval, modern history of East Asia, history of the world, and history of modern world. The school would have to select any one of the different optional courses provided in the syllabus. In other words, the history syllabus at this stage may comprise three semester courses in Indian history, one each for each period of Indian history, and one semester course in any one of the optional courses on non-Indian history. For the optional courses, a fourth semester optional course may be offered in the history of the contemporary world. Further efforts would be made to develop other optional courses at a later date.

While developing these courses, care has been taken to ensure that the syllabus is in tune with the approaches and methods of modern historical studies in the fields of teaching and administration. History and geographical science have been related to the curriculum and co-curricular activities has been given to the study of social and economic factors, political institutions and cultural and scientific developments. While devising courses in Indian history, an attempt has been made to ensure that the pupil develops an understanding of developments in all parts of the country and not only of those areas which were important as centres of large kingdoms and empires. The course on history of the contemporary world must of necessity offer a wide ranging of the contemporary world in a historical perspective.

There is a need to study social historical developments in a broader context and world perspective. The teacher will have to make connections with the broader world, world as a whole as well as particular regions and countries. The syllabus is designed to provide a broad perspective of the history of the world.

## HISTORY







# History

## Rationale

After ten years of general education the two years of higher secondary stage aims at initiating the pupil into the study of courses in a few subjects of his/her choice. This stage is very significant both as a terminal stage of school education enabling the pupil to enter life and as a preparatory stage equipping him/her to pursue higher academic studies in a few selected subjects. It is observed that a large percentage of students cease their formal education at the end of this stage. A large number join the world of work. A significant number of primary school teachers come from among those who have completed their formal schooling up to this stage. In other words, higher secondary stage is a very crucial stage of education in the school system as a whole.

For the first ten years of schooling, history forms an integral part of the social science curriculum in general education. It aims at introducing the pupil to some of the main trends and developments in the history of India and of the world. Keeping the requirements of general education in view, some components of history in story-telling form are incorporated in environmental studies at the primary stage from Classes III to V and some more components are integrated in social science from Classes VI to X.

History as an independent discipline will be introduced at the higher secondary stage. The pupil may be initiated into a systematic study of the subject for the first time and introduced to the rigours of the discipline.

The foundation for studying history already laid in a rudimentary form at the upper primary and secondary stages would have to be strengthened at the higher secondary stage. The courses may be developed in a way to enable the pupil to pursue an advanced course in history. Further, some knowledge of the broad trends in the history of the world would enable the pupil to study the developments in India as well as in other countries in the overall perspective of world developments. No doubt, the study of Indian history would re-

ceive adequate attention but the courses devised for this stage will not be exclusive to Indian history.

Thus, it is proposed that, the study of Indian history may be a compulsory part of the courses at this stage. Simultaneously, there would be optional courses related to specific aspects and periods of non-Indian history, such as the history of contemporary world, modern history of East Asia, history of West Asia and history of modern world. The pupil would have to select any one of the different optional courses provided in the syllabus. In other words, the history syllabus at this stage may comprise three semester courses in Indian history, one each for each period of Indian history, and one semester course in any one of the optional courses on non-Indian history. For the present, the fourth semester (optional) course may be a course in the history of the contemporary world. However, efforts would be made to develop other optional courses at a later date.

While developing these courses, care has been taken to devise them in conformity with the approaches and findings of modern historical scholarship. Details of dynastic and administrative history and biographical details have been reduced to the minimum and necessary emphasis has been given to the study of social and economic forces, political institutions and cultural and scientific developments. While devising courses in Indian history, an attempt has been made to enable the pupil to develop an understanding of developments in all parts of the country and not only of those areas which were important as centres of large kingdoms and empires. The course on history of the contemporary world aims at promoting an understanding of the contemporary world in a historical perspective.

There is a need to study local historical developments in a broader countrywide and worldwide context. Such studies with their inter-connections with the broader world would act as antidote to parochialism and regional cultural chauvinism. Placed in the learner's immediate environment



such studies also make the learning process very relevant and enjoyable in the long run. However, the objective cannot be realized by underlining any one or two or a few regions or states in the syllabus devised for the country as a whole. Therefore, it is proposed that, a seminar or tutorial paper or essay on a theme related to local history and culture within 2000 words should form an integral part of evaluation in each semester of the higher secondary stage. This would enable the pupil to use various sources for analyzing the history and culture at the local level. Further, it would initiate him/her into the methods of historical enquiry. Maximum 10% weightage may be given to the writing and presentation of the paper. As an incentive to the pupil, some of the best papers could be preserved in the History Room or library of the school for wider circulation.

As the study of history at this stage is intended to initiate the pupil into the rigours of the discipline, it is necessary to introduce him/her to the elements of historical methodology, of how the historian works. For this he/she should be acquainted with the various kinds of sources, which form the raw materials of historical studies. The pupil may be encouraged to study the sources critically by taking of project work which involves the use of sources compulsorily. As stated earlier, some importance in the project work may be given to the study of local monuments, archaeological and historical sites and cultural traditions. Attempts should be made to develop a History Room in the school in which historical maps and other materials of historical and cultural importance may be exhibited. Some importance should be given to the study and use of historical maps, which should form a compulsory part of teaching/learning. The teaching/learning should not be confined to the textbook alone. Visits to museums, archives and historical sites and work in the library should be made a compulsory component of teaching/learning at this stage. The pupil should have access to reference materials on the subject in the library. Problem solving group discussions and Quiz, etc., may form an integral part of instructional strategy at this stage.

### Objectives

The objectives of the history courses at this stage may be as follows:

- to initiate the pupil into methods of historical enquiry;

- to provide authentic historical knowledge and understanding of those regions and periods which the pupil has chosen to study;
- to develop an attitude of studying the past in its context;
- to help develop a spirit of enquiry and critical appreciation of the past so that pupil's personality is free from prejudices and bigotry, parochialism and communalism;
- to help develop an understanding of the importance of historical perspective in the study of contemporary issues and problems.

### Curricular Concerns and Common Core Components

The National Curriculum Document for School Education – 2000 has envisaged certain core components for their integration in the syllabuses. Adequate care would be taken to do so in the history syllabus and texts in a logical, comprehensive and suitable manner. Some of the curricular concerns which would get adequate reflections at this stage are:

- abiding by the constitution and respecting its ideals;
- cherishing and following the noble ideals which inspired the Indian nationalism and freedom struggles;
- upholding and protecting the sovereignty, unity and integrity of India;
- promoting harmony and the spirit of common brotherhood among the people of India transcending religions, linguistic and regional or sectional boundaries;
- renouncing practices derogatory to the dignity of women;
- respecting and preserving the rich heritage of India;
- developing the spirit of enquiry reform and humanism;
- safeguarding public property and abjuring violence;
- integrating traditional knowledge and India's contributions to humankind;
- strengthening and promoting national identity, nationalism and preserving cultural heritage;
- meeting the challenge of information and communication technology.



## Course Structure

## CLASS XI

## Semester I

- Ancient India

## Semester II

- Medieval India

## CLASS XII

## Semester - III

- Modern India

## Semester IV

Any one of the following:

- History of the Contemporary World
- History of East Asia
- History of West Asia
- History of Modern World

**Note:** For the present, only the course in the History of the Contemporary World has been devised. Other courses would be devised at a later date. Each semester would be for about six months duration. There would be approximately 104 periods available for each course, the duration of one period being 35-40 minutes.

## Evaluation

Semesterization is recommended for this course. 40% weightage in terms of marks in each semester will be allocated to continuous and comprehensive assessment and the remaining 60% to the final examination.

Continuous and comprehensive assessment remains important even outside the semester system, in which case 60% weightage in terms of marks will be allocated to continuous and comprehensive evaluation and the remaining 40% to the final examination.

## CLASS XI

## Semester I

## Ancient India

(Periods 104)

## Unit I: Introduction

Tradition of History writing – Beginning of the Modern historiography – Significance of tradition as related to history – The traditional

history of India – Limitation and significance. Scope, nature, method and sources of Ancient India – Literary – Archaeological – Foreign Accounts. Geological and Geographical background of Indian history. Eternal India: A cultural setting in a geographical locale.

## Unit II: Early Indian cultural patterns

Paleolithic cultures of India. Neolithic Age – Beginnings of the settled life – agriculture and domestication of animals. Chalcolithic Age – Copper Age.

## Unit III: The Harappan Civilization

Phases, Extent and Antiquity – Authors of the civilization. Town Planning and Material Life – Buildings, Drainage, Great Bath, Granaries Fortification, etc. – Social Life – Economic Activities: Weight and Measures, Tools and implements, Medicine, Weapons, Trade and Commerce, Industries like Spinning, potteries, seals, metals & stones. Spiritual and Religious Life – Yogic figurines – Mother goddess – Shiva Worship – Nature Worship: animal worship, fire, water, etc. Funerary customs – Art and Aesthetics – dress – ornaments – household and toilet items – games, etc. – Harappan Script – Contacts with other contemporary cultures – The Vedic connection and legacy of Harappan civilization.

## Unit IV: The Vedic Culture

The Vedic literature – The classification of Early and Later Vedic periods – India as described in Vedic literature – Known Geographical extent of Vedic civilization – The antiquity of Vedas and Vedic people – Spiritual and religious traditions of the Vedic India – The material culture as described in the Vedas – Political organization – Sabha, Samiti, Rashtra, etc. concept and practice – Social organization – Economic Activities – The Aesthetics – The Mathematics and Science (Third to First millennium B.C.)

## Unit V: South and North-East India

South India from Megalithic culture to Sangam Literature – The prehistoric man in North-East India.

## Unit VI: Germination of High Philosophy

The Spiritual and Philosophical thought as described in Upanishads, Brahmins and the Sutras – Upanishadic thought as predecessor to and its link with Jain, Buddhist and other



new streams of thought – The contribution of India to the Philosophical thought of the World  
– The legacy and significance.

### **Unit VII: Jainism and Buddhism**

Early Tirthankaras to Mahavir – The rise and growth of Jainism – Doctrines, and the philosophic and spiritual content of Jainism – Jainism: Canon, and icons, spread of Jainism after Mahavir, Contribution of Jainism – Gautam Buddha – Early Life – Dhamma: The doctrines of Buddhism – Sangha: The organization of the Buddhist Sangha – The History of Buddhist Sangha, Spread of Buddhism – Buddhist sculpture – the icons and images of Buddha – The Buddhist Literature and India as described in it – The Pitakas, the Nikayas – Sutta Nipata, Therigatha, Jatakas and Milind Panho. Other sects.

### **Unit VIII: Mahajanpadas**

The Sixteen Mahajanpadas – The Autonomous Clans – Rise and expansion of Magadhan Empire – causes and consequences – Iranian and Macedonian invasions and their consequences.

### **Unit IX: Mauryas**

The political conditions – Chanakya and his efforts for geographical and political unity – Rise of Chandragupta Maurya – Maurya attempts at political unity of India – Expansion and consolidation of the Maurya Empire – Ashoka his early conquests and the extent of Ashoka's empire – Arthashastra – Maurya Administration – society – economy – religion – art and architecture – Language – Science and Technology – Crafts, artisans and their organization – Trade and Commerce: inland and overseas – his inscriptions – Ashoka and spread of Buddhism – contacts with outside world – The later Mauryas and decline of the empire – causes. The legacy of Mauryas.

### **Unit X: Post-Maurya India**

The Political situation in Post Maurya Period: The Shungas – Pushyamitra – Kanvas – The Yavanas – Shakas and the Parthians – The Kushanas – The beginnings of the Vikram Samvat and Saka Samvat. The Rise of Powers: North and East – Satraps of Western India – Deccan and the South.

### **Unit XI: The Social Life as reflected in Contemporary Literature from 300 BC to 300 AD**

The Literature: Epics – The Dharmashastras

and Smritis – The Sangam and other Literature – Social Conditions: Caste – four stages of Life – family life – Institution of Marriage and Status of Women – Aesthetic life – Dress and ornaments, households and furniture – food and drink – general life – Achievements in Material Progress – The Status of Science and Technology – Trade and Commerce with foreign countries – India and her relations with outside world: Western countries – India and Greece – India and Egypt – India and the Roman Empire – India in Western Literature, India and Central Asia – India and Sri Lanka – India and South and South East Asia.

### **Unit XII: India from Guptas to Harsha**

The emergence of the Guptas – Chandragupta I, Samudragupta and Chandragupta II. Their conquests and Vikramaditya tradition. Expansion and consolidation of Gupta Empire – Gupta Polity – Administration – the later Guptas and the decline of the dynasty – Gupta attempt to unite India. India after the decline of Guptas – Rise of Valabhi – Gurjars of Rajputana – and Nandipuri – The rise of Maukharis – Prabhakarvardhan – Rajyavardhan – Harshvardhan – The Dynasties of Deccan and the South.

### **Unit XIII: The Society and Culture in the age of Guptas and Harsha**

Literature – Sanskrit – Tamil – Foreign accounts – The Religion – Buddhism – Jainism – Vaishnavism – Shaivism – Minor Religious sects, Christianity – India as described by Fakhien – Art and Architecture – Sculpture (various schools) – Paintings Ajanta, etc. Cave temples – Terracotta – Coins and seals, etc. – Achievements in science and technology – Social conditions – Education – Economic conditions – India and the outside world – West – China – Central Asia – Tibet – South East Asia – Trade and Commerce with the world – Influence of India on World Civilization with special reference to South East Asia.

### **Unit XIV: India after Harsha: The Rise of Small Kingdoms**

The Contemporary Political conditions and the Tripartite conflict between the Rashtrakutas, Pratiharas and Palas – Northern and Eastern India – Central and Western India – The Arabian Intrusions into India – The Deccan and



South – The second tripartite war among Paramaras, Chandellas and Chahamanas and the advent of Muslims in India.

### **Unit XV: Society and Culture in Post-Harsha Period**

Language and Literature – Religion and Philosophy – Social and Economic life – Art and Architecture, Literature, Science and Technology, Trade and Commerce Crafts. Spread of Indian Culture abroad with special reference to South East Asia and East Asia.

## **Semester II**

### **Medieval India (Periods 104)**

#### **Unit I: Medieval Period**

Historiographical debate and Sources of history for the period – Rise of Islam and Arabia – Arabian Invasions of India and their impact. India's contact with other parts of the world with special emphasis on relations with South East and East Asia.

#### **Unit II: The Rise of Ghaznavis**

Sabuktigin – Mahmud – Turkish invasions – Establishment of Delhi Sultanat – Phases of expansion – invasions of Taimur and the end of Tughlaqs. The successors of Sultanat – Gujrat, Khandesh and Malwa, Jaunpur, Bengal, Sindh and Multan – Government and Life under Delhi Sultanat – Social and economic conditions – Religions – Trends in population – Art and architecture.

#### **Unit III: The Political Conditions**

Growth of small Kingdoms – Mewar and Marwar (Rajasthan) – Eastern Gangas and the Gajapatis of Orissa – Kashmir: Rise of Cholas (from Rajraja the Great to Rajendra III) – Political organization with special emphasis on Local Self Government – Language and Literatures – Religion and Philosophy – Social and Economic conditions – Art and Architecture – Cultural Expansion –Yadavas, Senas, and Deva Dynasty in East India –Kingdom of Assam – Tripura – Manipur and Jayantia. Nepal, and Bihar – Rashtrakutas and Gahadavals – The Chandellas and Kalachuris (both of Tripuri and Ratnapur) – Later Chalukyas and Kalachuri of Kalyani –Yadavas of Devagiri. The Eastern Deccan – Kakatiya, Chalukyas and Gangas – Somvanshis, etc. – The Hoysalas – and Later Pandyas. Age of Vijaynagar and Bahamanids – Political history.

Life under Vijyanagar – Trade and Commerce – Art and Architecture – major contributions. Malabar and coming of the Portugese – The Advent of the Mughals: Early Mughal invasion and conquests – Shersah and his Achievements – Akbar, his expansion and consolidation of the empire – Mughal Administration and the Army – Contacts with foreign lands. Collaboration with the smaller states – Resistance to the Mughal power– Rajputs, Sikhs, Jats, Marathas, Satnamis, Bundelas, Gujrat and Kashmir. Disintegration of the Mughal Empire – Life and Times during the Mughal age: Social-economic conditions – Language and Literature – Art and architecture, - Religion and Philosophy, Science and Technology, etc. The legacy, heritage and significance of Medieval India.

## **CLASS XII**

### **Semester III**

#### **Modern India (Periods 104)**

##### **Unit I: Introduction and Sources of Modern Indian History**

##### **Unit II: Late 18th Century India and Struggle for Power**

Hyderabad and Karnatic, Bengal, Assam and North-East Avadh, Mysore, Areas around Delhi, Bangash, Pathans and Rohillas, Rajputana, the Sikhs and Maratha power.

##### **Unit III: Rise of the British**

European companies and their settlements in India – Dutch, Portuguese, French, and British – Anglo-French struggle in South India, British occupation of Bengal – dual administration in Bengal – Establishment of British paramountcy under Lord Hastings (1813-1822), conquest of Sindh, Dalhousie and the policy of annexation.

##### **Unit IV: Structure of Government and Administrative organization of the British Empire in India (1757-1857)**

Structure of Government – civil service, army, police, judicial organization – Its merits and defects, elements of distrust, rule of law and equality before law.

##### **Unit V: Uprising of 1857**

Causes of discontent against British rule – beginning, growth and immediate causes of 1857 uprising; cause of its failure, Nature and results.



**Unit VI: Economic Impact of British Rule**

Disruption of traditional economy – ruin of artisans and craftsmen, impact of British revenue policy, stagnation of agriculture, development of modern industries, poverty and famines.

**Unit VII: Social and Religious Reforms**

Raja Rammohan Roy and Brahmo Samaj, Jotiba Phule, Dayanand and Arya Samaj, Ramakrishna and Vivekanand, Aurobindo, Narayan Guru, Veerasalingam, Theosophical Society, Sayyad Ahmad Khan and Aligarh Movement, Religious reforms among Sikhs, Social Legislation and Indian response.

**Unit VIII: National Movement (1857-1905)**

Consequences of foreign domination, administrative and economic unification of the country, Western thoughts and education and its impact on India; role of press and literature, rediscovery of India's past, racial arrogance of British, Predecessors of National Congress, Indian National Congress and early phase of National Movement (1885-1905), other political organization.

**Unit IX: Nationalist Movement (1905-1918)**

Recognition of the true nature of British rule, growth of self-respect and self-confidence, nationalist school of thought, Partition of Bengal, Anti-partition movement, swaraj, swadeshi and boycott, and its impact, Nationalist movement, growth of revolutionaries, Indian National Congress (1905-1914), the Muslim League, the Home Rule Leagues, Lucknow Session of the Congress (1916).

**Unit X: Struggle for Swaraj (1919-1947)**

Constitutional changes in 1919 and 1935, Mahatma Gandhi and Independence movement, his ideas of non-violence and satyagraha and constructive programme; movement against Rowlatt Act, Jallianwala Bagh Massacre, Khilafat and Non-cooperation Movements, revolutionaries, Simon Commission and Indian reaction, civil disobedience movement, Indian Councils Act of 1935, Formation of Congress ministries, Quit India movement, Subhas Chandra Bose and INA, growth of Communalism and partition of India, Independence and immediate problems.

**Unit XI: Path of Progress and Building of Strong India**

Models for the Economic Developments Five Year Plans – Industrialisation, Green Revolution, Upliftment of poor, Emphasis on Primary and Higher Education, Establishment of Universities and IITs, Nuclear and Space Research programmes, other scientific and technological developments, communication and information technology, relations with superpowers and with neighbours.

tion, Upliftment of poor, Emphasis on Primary and Higher Education, Establishment of Universities and IITs, Nuclear and Space Research programmes, other scientific and technological developments, communication and information technology, relations with superpowers and with neighbours.

**Semester IV****The Contemporary World****(Periods 104)****Unit I: Introduction**

Contemporary period in world history – Distinction between contemporary history and modern history – Characteristic features of contemporary history- A broad survey of the historical background of the contemporary world.

**Unit II: Beginning of Modern age**

Renaissance – Reformation – Scientific inventions – Geographical explorations – Rise of Colonialism – Bloodless Revolution – French Revolution – American War of Independence – Rise of Nationalism with reference to Italy and Germany – Evolution of Parliamentary system in Britain – Emergence of Socialist Ideas.

**Unit III: The World from about the End of the Nineteenth Century to the End of the First World War**

Developments leading to the First World War – Consequences including its impact on India. The Russian Revolution.

**Unit IV: The World from 1919 to 1939**

League of Nations- Fascism in Italy – Economic depression-Its economic, social and political consequences – Nazism in Germany – The New Deal – Growing importance of the U.S.A. in the world – Developments in Britain and France – Emergence of the U.S.S.R. Development in Africa and Latin America (1919-1939) – Nationalist movements in Asia – Militarism in Japan – Japan's emergence as a world power. Aggression and Appeasements - Japanese invasion of China – Italian invasion of Ethiopia – Nazi Germany's role in world affairs – Anti-Comintern Pact - Munich Pact.

**Unit V: The Second World War**

Causes of the Second World War- German invasion of Poland and outbreak of war - Fall of France. The War becomes a global war – Invasion of the USSR – US entry into the War – Course of the War. End of the War -



Destruction caused by the war - The Atom Bomb - Plans of the post-War reconstruction of the world - United Nations - UN Declaration of Human Rights

#### **Unit VI: The World after the Second World War**

General Features- Political composition of the world after the Second World War- Disintegration of the colonial imperialist system - Neo-colonialism - Emergence of the U.S.A. and U.S.S.R. as world powers- Formation of Israel - Revolution in China -Formation of N.A.T.O. and Warsaw pact-Cold War-Socio-economic impact of cold war in Europe - Nuclear weapons-Development in Asia and Africa (including Tibet) Success of the movements of national independence - National liberation movements in Africa - Struggle against apartheid - Bandung conference - The Non-aligned Movement.

The rise of Mikhail Gorbachev and beginnings of the Soviet disintegration - decline of communism in Europe and collapse of Soviet

system - its impact on the world - changes in Europe and China - Germany, Czechoslovakia, Romania.

#### **Unit VII: Polity, Economy and Society in the Contemporary World**

Main forms of the State in the contemporary world - The process of industrialization and its impact - Impact on non industrialized countries - Problems of development, Terrorism, etc.

#### **Unit VIII: Development in Science, Technology and Culture**

Major developments in science and technology - New sources of energy - Industrial production - Transport and communications - Means of destruction - Developments in biological sciences - Information technology. Literature and art in the contemporary world. Impact of the revolution in communications - The mass media - Newspapers, Radio, Cinema, Television and Computers - Impact on culture.

GEOGRAPHY







# Geography

Geography is considered as an elective subject at the secondary stage. After ten years of general education, students branch out at the beginning of secondary stage and are exposed to the rigours of a new subject for the first time. Being an elective subject, students choose to study Geography according to their academic interest. Some students need a broader and deeper understanding of the subject. For others, geographical knowledge is needed in daily lives because it is a useful tool for the education of young citizens. Contributions lie in the content, cognitive skills and values that geography education helps the students explore, understand and evaluate the environmental and social issues of the world. Geography explores the relationship between the environment and their environment. It includes the study of physical and human environments and their interactions at different scales – local, state/region and the world. The fundamental responsibility for the varieties in the distribution of physical and human features across the earth's surface need to be understood properly. Application of these principles should be taken up through selected case studies in the world and India. Thus, the physical and human environment of India and study of its issues from a geographical point of view will be covered in greater detail. Students will be exposed to different methods used in geographical study.

## Objectives

The course in geography will help learners:

- familiarise themselves with the terms, key concepts and basic principles of geography;
- search for, recognise and understand the processes and patterns of the spatial arrangement of the natural as well as human features and phenomena on the earth's surface;
- understand and analyse the inter-relationship

between physical and human environments and their impacts;

- apply geographical knowledge and methods of inquiry to new situations or problems at different levels – local/regional, national and global;
- develop geographical skills, relating to collection, processing and analysis of data/information and preparation of report including graphical and use of computers wherever possible; and
- clarify their personal values towards issues concerning the community and become responsible as well effective members of the country.

## GEOGRAPHY

As per the *National Curriculum Framework for School Education* (2000), such as education for a cohesive society, responding to the impact of globalisation, meeting the challenge of information and communication technology, linking education with life-skills, strengthening national identity and preserving cultural heritage, and education for value development will be taken care of while developing the syllabus.

Apart from these, old *Common Core Components* (NCF 1993), such as India's common cultural heritage, equality of sexes, protection of environment, observance of the small family norm and inculcation of aesthetic temper will be reflected in the geography syllabus along with Fundamental Duties like promoting harmony and the spirit of common brotherhood among all the people of India transcending religious, linguistic and regional or sectional diversities, renouncing practices derogatory to the dignity of women, value and preserve the rich heritage of our composite culture, protect and improve the natural environment including forests, lakes, rivers and wildlife and have compassion for the living creatures, develop scientific temper, humanism and the spirit of inquiry and reform as well as strive to attain excellence in all spheres of life.



GEOGRAPHY



# Geography

## Rationale

Geography is introduced as an elective subject at the higher secondary stage. After ten years of general education, students branch out at the beginning of this stage and are exposed to the rigours of the discipline for the first time. Being an entry point for the higher education, students choose geography for pursuing their academic interest and, therefore, need a broader and deeper understanding of the subject. For others, geographical knowledge is useful in daily lives because it is a valuable medium for the education of young people. Its contributions lie in the content, cognitive processes, skills and values that geography promotes and thus helps the students explore, understand and evaluate the environmental and social dimensions of the world in a better manner.

Since geography explores the relationship between people and their environment, it includes studies of physical and human environments and their interactions at different scales – local, state/region, nation and the world. The fundamental principles responsible for the varieties in the distributional pattern of physical and human features and phenomena over the earth's surface need to be understood properly. Application of these principles would be taken up through selected case studies from the world and India. Thus, the physical and human environment of India and study of some issues from a geographical point of view will be covered in greater detail. Students will be exposed to different methods used in geographical investigations.

## Objectives

The course in geography will help learners:

- familiarise themselves with the terms, key concepts and basic principles of geography;
- search for, recognise and understand the processes and patterns of the spatial arrangement of the natural as well as human features and phenomena on the earth's surface;
- understand and analyse the inter-relationship

between physical and human environments and their impact;

- apply geographical knowledge and methods of inquiry to new situations or problems at different levels – local/regional, national and global;
- develop geographical skills, relating to collection, processing and analysis of data/information and preparation of report including graphics; and use of computers wherever possible; and
- clarify their personal values towards issues concerning the community and become responsible as well effective members of the country.

*Curricular Concerns (National Curriculum Framework for School Education, 2000)*, such as education for a cohesive society, responding to the impact of globalisation, meeting the challenge of information and communication technology, linking education with life-skills, strengthening national identity and preserving cultural heritage, and education for value development will be taken care of while developing the syllabus.

Apart from these, old **Common Core Components (NPE 1986)** such as India's common cultural heritage, equality of sexes, protection of environment, observance of the small family norm and inculcation of scientific temper will be reflected in the geography syllabus along with Fundamental Duties like promoting harmony and the spirit of common brotherhood among all the people of India transcending religions, linguistic and regional or sectional diversities, renouncing practices derogatory to the dignity of women, value and preserve the rich heritage of our composite culture, protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for the living creatures, develop scientific temper, humanism and the spirit of enquiry and reform as well as strive towards excellence in all spheres of individual and collective



activity so that the learners rise to higher levels of endeavour and achievement.

Keeping the above in view, the geography course has been divided into four semesters at the higher secondary stage. Each semester would be of about six months' duration. The semester-wise distribution of the course is as follows:

### Course Structure

#### CLASS XI

##### Semester I

- A. Fundamentals of Physical Geography
- B. Practical Work (Unit I)

##### Semester II

- A. India – Physical Environment
- B. Practical Work (Unit II)

#### CLASS XII

##### Semester III

- A. Fundamentals of Human Geography
- B. Practical Work (Unit III)

##### Semester IV

- A. India – People and Economy
- B. Practical Work (Unit IV)

**Note:** There will be five textbooks, one for theory in each semester and one for practical work having four units, one unit will be covered in each semester.

### Evaluation

Semesterisation is recommended for this course. Forty per cent of the marks for each semester would be for continuous assessment and sixty per cent for the final examination. In case there is no semesterisation, there will still be continuous and comprehensive evaluation. Sixty per cent of the marks will be allocated for continuous evaluation and forty per cent of the marks will be for the final examination.

#### CLASS XI

##### Semester I

- A. Fundamentals of Physical Geography (Periods 68)

##### Unit I: Geography as a Discipline (Periods 5)

- Geography as an integrating discipline, as a science of spatial attributes;

- branches of geography; importance of physical geography.

##### Unit II: The Earth

(Periods 12)

- Origin and evolution of the earth; continents and oceans; interior of the earth; Wegener's continental drift theory, theory of plate tectonics; earthquakes and volcanoes;
- Rocks and minerals – major types; soils – formation, major types and characteristics.

##### Unit III: Landforms

(Periods 12)

- Concepts of evolution of landforms; typology of landforms;
- Geomorphic processes – weathering and mass wasting, erosion and deposition.

##### Unit IV: Climate

(Periods 24)

- Atmosphere – composition and structure; elements of weather and climate;
- Insolation – angle of incidence and distribution; heat budget of the earth – heating and cooling of atmosphere, conduction, convection, terrestrial radiation, advection; temperature – factors controlling temperature; distribution of temperature – horizontal and vertical; inversion of temperature;
- Pressure – pressure belts; winds – planetary, periodic and local; air masses, fronts and cyclones;
- Precipitation – evaporation; condensation – dew, frost, fog, mist and cloud; rainfall – convectional, orographic and cyclonic; world distribution of rainfall;
- World climates – classification (Trewartha); greenhouse effect, global warming and global climatic changes.

##### Unit V: Water (Oceans)

(Periods 10)

- Distribution of water bodies on the earth's surface, hydrological cycle;
- Oceans – submarine relief; distribution of temperature and salinity; movements of ocean water – waves, tides and currents.

##### Unit VI: Life on the Earth

(Periods 5)

- Biosphere – its functioning; importance of plants and other organisms; biodiversity and conservation; ecosystems, energy flow, and ecological balance.



## B. Practical Work (Periods 22)

### Unit I: Fundamentals of Maps

- Maps – types; scale – types; construction of linear scales, measuring distance, finding direction and use of symbols; (Periods 8)
- Latitude, Longitude and time; (Periods 4)
- Map projection: types, construction and properties of conical with one standard parallel and Mercator's projection. (Periods 10)

## Semester II

### A. India – Physical Environment (Periods 68)

#### Unit I: Introduction (Periods 8)

- Location – as a factor in shaping India's place in the world;
- Geological history.

#### Unit II: Physiography (Periods 22)

- Geological structure and Relief Features;
- Drainage systems – the Himalayan and the Peninsular; concept of water sheds;
- Physiographic divisions.

#### Unit III: Climate, Vegetation and Soil (Periods 24)

- Weather and climate – spatial and temporal distribution of temperature, pressure, winds and rainfall; Indian monsoons: mechanism, onset and variability – spatial and temporal; climatic types;
- Natural vegetation-biotic resources; forest – types and distribution; wild life; conservation and management; biosphere reserves;
- Soils – major types (ICAR's classification) and their distribution, soil deterioration, conservation and management.

#### Unit IV: Natural Hazards and Disasters: Causes and Consequences (Periods 14)

- earthquakes
- landslides
- droughts
- floods and cyclones

## B. Practical Work (Periods 22)

### Unit II: Topographic and Weather Maps

- Study of topographic maps (1:50,000 or

1:25,000, Survey of India maps) : contour cross-section and identification of landforms hills, valleys, waterfalls, cliffs; distribution of settlements; (Periods 10)

- Air-photos and satellite imageries: identification of physical and cultural features on the basis of tone and shape; (Periods 4)
- Use of weather instruments and weather charts : thermometer, wet and dry-bulb thermometer, barometer, windvane, rain gauge; use of weather charts describing pressure, wind and rainfall distribution. (Periods 8)

## CLASS XII

### Semester III

#### A. Fundamentals of Human Geography (Periods 70)

##### Unit I: Human Geography: Nature and Scope (Periods 4)

##### Unit II: People (Periods 10)

- Population of the world – number, growth and density;
- Population change – spatial patterns and structure; determinants of population change.
- Age-sex ratio; rural-urban composition;
- Human development – concept; selected indicators, international comparisons.

##### Unit III: Human Activities (Periods 24)

- Primary activities – concept and changing trends; gathering, pastoral, mining, subsistence agriculture, modern agriculture; people engaged in agriculture and allied activities;
- Secondary activities – concept; manufacturing: agro – processing, household, small scale, large-scale; people engaged in secondary activities;
- Tertiary activities– education, health, business, transport and communication; people engaged in services;
- Quarternary activities – concept; knowledge-based industries.

##### Unit IV: Transport, Communication and Trade (Periods 20)

- Land transport – roads, railways – rail network; trans-continental railways;



- Water transport – inland waterways; major ocean routes;
- Air transport and the shrinking world – inter-continental air routes;
- Oil and gas pipelines;
- Mass communication; satellite communication including computer networking – internet; cable and wireless communication;
- International trade – its basis and changing patterns; ports as gateways of international trade, role of WTO in international trade.

#### **Unit V: Human Settlements** (Periods 12)

- Settlement types – rural and urban; problems of human settlements in developing countries; distribution of large cities.

#### **B. Practical Work** (Periods 20)

#### **Unit III: Processing of Data and Thematic Mapping**

- Data analysis, diagrams and maps;
- Tabulating and processing of data matrix; uses and calculation of averages, deviation measures and correlation;
- Representation of data – construction of diagrams: bars, circles and flowchart; preparation of thematic maps: dot, choropleth and isopleth;
- Use of computers in data processing and mapping.

### **Semester IV**

#### **A. People and Economy** (Periods 70)

##### **Unit I: People** (Periods 10)

- The people of India – ethnic, linguistic and religious composition;
- Population: distribution and density; population change through time – regional variations;
- Demographic patterns in terms of rural-urban, age-sex, workers and non-workers, occupation ;
- Human development – selected indicators and regional patterns;
- Population, environment and development.

##### **Unit II: Human Settlements** (Periods 8)

- Rural settlements – house types, types of rural settlements, distribution pattern;

- Urban settlements – types, distribution, functional classification.

#### **Unit III: Resources and Sustainable Development** (Periods 30)

- Resources – concept of resources; resources and development: types and distribution; utilisation of resources; conservation of natural resources;
- Water resources – availability and utilisation – irrigation and other uses; scarcity of water and conservation methods – rain harvesting and watershed management;
- Land use; arable land, agriculture – wet and dry; agricultural development and problems; crop intensity and major crops;
- Mineral and energy resources – major metallic and non-metallic minerals and their distribution; conventional and non-conventional energy sources, distribution and utilisation;
- Industries – types and distribution; industrial location and clustering; changing pattern of selected industries- iron and steel, cotton textiles, sugar, petrochemicals, and knowledge based industries; impact of liberalisation, privatisation and globalisation on industrial location;
- Planning in India: need for sustainable development.

#### **Unit IV: Transport, Communication and International Trade** (Periods 14)

- Transport and communication – roads, railways, waterways and airways; oil and gas pipelines; national electric grids; communication networkings – radio, television, satellite and computers;
- International trade – changing pattern of India's foreign trade; sea ports and airports.

#### **Unit V: Geographical Perspective on Selected issues and problems** (Periods 8)

- Environmental pollution;
- Hunger and poverty;
- Urbanisation – growth of cities; rural-urban migration; problem of slums; urban-waste disposal.

#### **B. Practical Work** (Periods 20)

#### **Unit IV: Field Study or Spatial Information Technology**

Field visit and study: map orientation, observation and preparation of sketch; survey on



any one of the local concerns: pollution, ground water changes, land-use and land-use changes, poverty, energy issues, soil degradation, drought and flood impacts (any one topic of local concern may be taken up for the study; observation and questionnaire survey may be adopted for the data collection; collected data may be tabulated and analysed with diagrams and maps):

or

### **Spatial Information Technology**

Use of computers: components of computer, raster and vector data, data sources, data entry, data manipulation, construction of diagrams and data mapping.

POLITICAL SCIENCE







# Political Science

This stage is very significant in the career of a student. Students enter this stage after completing ten years of schooling and obtain the first opportunity of specialisation. This stage may be a turning point, enabling them to enter life or a profession or pursuing higher academic studies in a specialised subject of their choice. This stage is a stage of transition from a general education to a specialised education with a phase of rapid development and changes among learners themselves. Interests and attitudes start being formed and they need diversified choices to pursue their pursuit of studies, and this stage offers an opportunity of transition from a general curriculum to specialised courses.

The Political Science curriculum has to be designed keeping in mind the "leap" about in the nature of teaching-learning during ten years of general education. The integrated social science syllabus has been followed upto secondary stage.

This stage is very crucial for the students who are studying Political Science at the higher secondary stage. Students will be entering the higher secondary stage without having any kind of subject-specific exposure. They will get the first opportunity to study Political Science as an independent subject.

## Objectives

- The study in Political Science will help to:
  - develop in the learners an interest in the theory and principles of Political Science;
  - acquaint them with the approaches by which Political Scientists study political phenomena;
  - provide them with an intelligent and comparative understanding of the Indian Constitution and its functioning;
  - enable the learners to understand the important role played by the civil services in the democratic state;

- help the learners to understand an introduction to the theory and typology of politics as far as possible;
- develop an insight into various democratic processes;
- enable the learners to study and comprehend various dimensions of social problems;
- acquire the basic skills, attitudes and values which are necessary for making civic and political life;
- help learners to enter the skill of self-study and critical and problem-solving abilities;
- develop a better understanding of the Indian political system.

## Learning Outcomes and Common Core

The Political Science curriculum has to be designed keeping in mind the needs and aspirations of the learners. The needs and aspirations of the learners, particularly concerns like education for a welfare society, strengthening national identity and preserving cultural heritage, responding to the demand of globalisation, meeting the challenge of a democratic and communication technology, linking education with life-skills will be reflected in the Political Science syllabus.

The core components identified in the National Policy on Education, 1986 have been utilised and suitably infused in the Political Science course content. The core components are as follows:

- The history of India's freedom movement
- The constitutional framework
- The role of essential to nurture national identity
- Uphold and preserve cultural heritage
- Globalisation, democracy and social justice
- Equality of sexes
- Protection of environment
- Welfare of weaker sections
- The role of civil services
- The role of political parties



POLITICAL SCIENCE



# Political Science

## Rationale

The Higher Secondary Stage is very significant stage of school education. Students enter this stage of schooling after completing ten years of general education and obtain the first opportunity for diversification. This stage may be a terminal stage to enable them to enter life or a preparatory stage for pursuing higher academic studies in the selected subject of their choice. This stage, being a stage of transition from adolescent to youth, coincides with a phase of rapid development and changes among learners themselves. Their interests and attitudes start being crystallised and they need diversified choices in respect of their pursuit of studies, and this stage provides them an opportunity of transition from undifferentiated curriculum to specialised courses, the subject of Political Science being one of them.

It is important to note that a significant change has been brought about in the nature of teaching of social sciences during ten years of general education. An integrated social science syllabus has been introduced upto secondary stage.

This change is very crucial for the students who offer Political Science at the higher secondary stage. Students will be entering the higher secondary stage without having any kind of subject/discipline specific exposure. They will get the first opportunity to study Political Science as an optional subject.

## Objectives

The course in Political Science will help to:

- develop in the learners an interest in the theory and principles of Political Science;
- acquaint them with the approaches by which Political Scientists study political phenomena;
- provide them with an intelligent and comparative understanding of the Indian Constitution and its functioning;
- enable the learners to understand the important role played by the civil services in a dynamic state;

- help the learners in attempting an integration of the theory and applied politics as far as possible;
- develop an insight into various democratic processes;
- make the learners study and comprehend various dimensions of world problems;
- acquaint them with attitudes and values which are necessary for healthy civic and political life;
- help learners master the skill of self-study and nurture problem-solving abilities;
- develop a better understanding of the Indian political system.

## Curricular Concerns and Common Core Components

Since a meaningful school curriculum has to be responsive to the society, reflecting the needs and aspirations of its learners, curricular concerns like education for a cohesive society, strengthening national identity and preserving cultural heritage, responding to the impact of globalisation, meeting the challenge of information and communication technology, linking education with life-skills will be reflected in the Political Science syllabus.

The ten core components identified in the *National Policy on Education*, 1986 have been reaffirmed and suitably infused in the Political Science Course content. The core components are as follows:

- The history of India's freedom movement
- The constitutional obligations
- The content essential to nurture national identity
- India's common cultural heritage
- Egalitarianism, democracy and secularism
- Equality of sexes
- Protection of environment
- Removal of social barriers
- Observance of small family norm
- Inculcation of scientific temper



Besides, the ten core components mentioned above, the Fundamental Duties as laid down in Article 51A of Part IV A of the Indian Constitution, have also been included in the core components. Political Science syllabus in its semester II theme titled *Indian Constitution and Administration* gives a suitable and detailed placement to Fundamental Duties. The core components have been infused/included with the aim to instill a nationally shared perception and values in the learners. These components should create an ethos and value system in which a common Indian identity could be strengthened.

### Course Structure

Keeping the above in view Political Science course, in the higher secondary stage, has been divided into four semesters of about six months each. The semesterwise distribution of the course is as follows:

#### CLASS XI

##### Semester I

Society, State and Government

##### Semester II

Indian Constitution and Administration

#### CLASS XII

##### Semester III

Theories and Concepts of Political Science

##### Semester IV

Democracy in India

**Note:** Political Science course will be covered in four textbooks

### Evaluation

Semesterisation is recommended for this course. 40 percent of the marks for each semester would be for continuous assessment and 60 per cent for the final examination. In case there is no semesterisation, there will still be continuous and comprehensive evaluation of the students. 60 percent of the marks will be allotted for the continuous evaluation and 40 percent of the marks will be for the final examination.

#### CLASS XI

##### Semester I

**Society, State and Government (Periods 104)**

#### Unit I: Political Science: An Introduction

(Periods 20)

- Significance of the study of Political Science
- Changing meaning, nature and scope
- Relation with History, Economics, Ethics and Sociology

#### Unit II: Citizen, State and Society

(Periods 30)

- State and Society
  - (a) Need for the State and its elements
  - (b) Concept of state – Indian, Liberal and Marxist
  - (c) State and Society, State and Government, State and Nation, State and Citizenship
- State and Associations
  - (a) Meaning, Need and Kinds of Association
  - (b) Coordination of Loyalties and the National Identity.

#### Unit III: Political System

(Periods 20)

- (a) Political System and sub-systems
- (b) Constitution: Meaning and types: Rigid and Flexible, Written and Unwritten
- Forms of Government
  - (a) Democratic and Non-democratic
  - (b) Parliamentary and Presidential
  - (c) Unitary and Federal

#### Unit IV: Organs of Government

(Periods 34)

- Legislature
- Executive
- Judiciary
- Bureaucracy

**Note:** Indian examples to be given for comprehension by students.

#### Semester II

#### Indian Constitution and Administration

(Periods 104)

#### Unit I: Constitution: Background and Salient Features

(Periods 35)

- (a) Landmarks in the Constitutional Development
- (b) Indian National Movement and its Heritage
- Preamble to the Indian Constitution
- Indian Constitution – Salient Features
- Indian Federation and its working.



**Unit II: Fundamental Rights, Fundamental Duties and Directive Principles in the Indian Constitution** (Periods 25)

- Fundamental Rights
- Fundamental Duties
- Directive Principles of State Policy

**Unit III: Government at the Centre and in the States** (Periods 34)

- Government at the Centre – Legislature, Executive (including Emergency Provisions) and Judiciary
- Government in the States – Legislature, Executive and Judiciary
- Local Government Institutions - Urban and Rural and their Functions

**Unit IV: Indian Administration: Organisation and Functions** (Periods 10)

- Centre and State Administration
- District Administration

**CLASS XII**

**Semester III**

**Theories and Concepts of Political Science** (Periods 104)

**Unit I: Key concepts: Indian and Western Perspectives** (Periods 35)

- Law
- Liberty
- Equality
- Justice
- Human Rights
- Dharma

**Unit II : State and the Citizen** (Periods 14)

- Rights and Duties: Meaning and Relationship
- Changing nature of state activity: *Laissez faire*, welfare, globalization.

**Unit III: Comparative Politics** (Periods 20)

- Approaches to Comparative Politics: Traditional and Modern.
- Concepts –Political Socialisation, Political Participation and Political Development
- Systems of Representation

**Unit IV: Major Political Theories** (Periods 35)

- Liberalism
- Socialism

- Marxism
- Fascism
- Gandhism
- Humanism

**Note:** Indian examples to be given for comprehension by students

**Semester IV**

**Democracy in India** (Period 104)

**Unit I: Elections in India** (Periods 10)

- Adult Franchise and Electoral Participation
- Election Commission and Election Procedure
- Electoral Reforms

**Unit II: Party System, Public Opinion and Interest Groups** (Periods 15)

- Nature of Party System in India
- Role of Opposition
- Formation of Public Opinion
- Interest Groups and Pressure Groups

**Unit III: Development and Democracy** (Periods 20)

- Socio-economic Development/Development Planning in India: Machinery and Processes.
- Role of District Development Agencies
- Development of Weaker Sections, Women, Scheduled Castes/ Scheduled Tribes and OBC.

**Unit IV: Challenges and Responses to Indian Democracy** (Periods 25)

- Inequality: Social and Economic
- Illiteracy
- Regional imbalances – Regionalism and Linguism
- Communalism, Casteism, Separatism, Political Violence.

**Unit V: India and the World** (Periods 34)

- Foreign Policy of India: (a) Determinants (b) Basic Principles
- India and Her Neighbours: Nepal, Sri Lanka, China, Bangla Desh, Pakistan
- India's Relation with USA and Russia
- India and the United Nations
- India's Role in Non-aligned Movement (NAM)
- India and SAARC
- India's Approach to Major World Issues: Human Rights, Disarmament and Globalisation.







# Economics

Economics is introduced at the secondary stage in the form of an elective subject. At every stage of school education, economics, as a component of social studies, is dealt with in a very general manner. As the rigours of economic studies begin at the higher secondary stage, the students are in a position to develop their own understanding of the power of thinking, and are able to comprehend, and appreciate the various theories of economics. It is an appropriate stage when the student starts studying economics separately. At this stage, the students are able to deal with the issues involving the study of the Indian economy, the market forces, and the various higher levels of economic development, growth, structural changes, and the planning process. The course in economics of the Indian economy, including liberalisation. Besides, the course is designed to begin with the statistical tools to help them understand, interpret and explain the information or data, and draw conclusions. The course designed for this stage, thus, intends to provide an opportunity to acquaint and familiarise themselves with the recent developments in the discipline as well as with the functioning of the economic, financial and other aspects of the Indian economy.

The syllabus is proposed to include some project activities in the syllabus in order to enable the students to develop better insight. This would provide students an opportunity to have, not only a better understanding of the subject, but also to put to use the skills that they have acquired. The syllabus is structured as to help the students to use computers, wherever available, for analysis of data and preparation and presentation of report.

## Objectives

The course in economics will help learners to:

- familiarise themselves with some basic eco-

nomic theories and concepts such as demand, supply, consumption, production and distribution;

- understand the implications of market forces determining the choice and allocation of resources;
- get acquainted with the basic concepts of national income aggregates, theories of income and employment, money and functions of banks;
- familiarise themselves with the structure of the Indian economy and the economic development of India since independence;
- enhance their awareness of issues and problems confronting the Indian economy and the concepts of sustainable development;
- equip themselves with the various statistical tools to analyse, interpret and explain data.

# ECONOMICS

## Curricular Concerns and Common Core Components

The syllabus in economics has been designed keeping in view the curricular concerns such as integrating indigenous knowledge and India's contribution to mankind, impact of globalisation, meeting challenges of information technology, linking education for life-skills, education for value development, relating education to work and reducing curriculum load.

Some of the common core components having relevance to the syllabus in economics have also been integrated with it. Among these areas (a) egalitarianism, Democracy, Secularism (b) protection of environment and Fundamental Duties as laid down in Article 51A of part IV A of the Indian Constitution are taken care of.

## Course Structure

Keeping the above in view, economics course has been divided into four semesters at the higher secondary stage. Each semester would be of six months duration. The semesterwise distribution of the course is as follows:







# Economics

## Rationale

Economics, as a discipline, is introduced at the higher secondary stage in the form of an elective subject. At the secondary stage of school education, the study of economics, as a component of social science, has been dealt with in a very general manner avoiding the rigours of economic theory. But, at the higher secondary stage, the students are in a position to develop their own perception, exercise the power of thinking, and are also in a position to comprehend, and appreciate the basic concepts and theories of economics. It is, therefore, an appropriate stage when the students are initiated into studying economics separately as a discipline. At this stage, the students could be exposed to the issues involving the study of the structure of the economy, the market forces, the strategy of achieving higher levels of economic growth and development, structural and institutional changes, the planning process the new challenges before the Indian economy, including globalisation and liberalisation. Besides, the course aims at equipping them with the statistical tools that will help them understand, interpret and explain statistical information or data, and draw meaningful conclusions. The course designed for the students at this stage, thus, intends to provide them an opportunity to acquaint and familiarise themselves with the recent developments in the discipline as well as with the functioning of various economic, financial and other institutions.

It is also proposed to include some project activities in the syllabus in order to enable the students to develop better insight. This would provide the students an opportunity to have, not only a better understanding of the subject, but also to apply the skills that they have acquired. The syllabus is so structured as to help the students to use computers, wherever available, for analysis of data and preparation and presentation of report.

## Objectives

The course in economics will help learners to:

- familiarise themselves with some basic economic theories and concepts such as demand,

supply, consumption, production and distribution;

- understand the implications of market forces determining the choice and allocation of resources;
- get acquainted with the basic concepts of national income aggregates, theories of income and employment, money and functions of banks;
- familiarise themselves with the structure of the Indian economy and the economic development of India since independence;
- enhance their awareness of issues and problems confronting the Indian economy and the concepts of sustainable development;
- equip themselves with the various statistical tools to analyse, interpret and explain data and information.

## Curricular Concerns and Common Core Components

The syllabus in economics has been designed keeping in view the curricular concerns such as integrating indigenous knowledge and India's contribution to mankind, impart of globalisation, meeting challenges of information technology, linking education for life-skills, education for value development, relating education to work and reducing curriculum load.

Some of the common core components having relevance to the syllabus in economics have also been integrated with it. Among these areas (a) egalitarianism, Democracy, Secularism (b) protection of environment and Fundamental Duties as laid down in Article 51A of part IV A of the Indian Constitution are taken care of.

## Course Structure

Keeping the above in view, economics course has been divided into four semesters at the higher secondary stage. Each semester would be of six months duration. The semesterwise distribution of the course is as follows:



**CLASS XI****Semester I**

Introduction to Statistics

**Semester II**

Indian Economic Development

**CLASS XII****Semester III**

Introductory Micro-Economic Theory

**Semester IV**

Introductory Macro Economics

**Note:** There will be four textbooks, one for each semester.

**Evaluation**

Semesterisation is recommended for this course. 40 per cent of the marks for each semester would be continuous assessment and 60 per cent of marks will be allotted for the final examination. In case there is no semesterisation, there will still be continuous and comprehensive evaluation of the students. 60 per cent of the marks will be allotted for the continuous evaluation and the rest 40 per cent of the marks will be for final examination.

**CLASS XI****Semester I****Introduction to Statistics (Periods 104)****Unit I: Introduction (Periods 5)**

- Meaning, Scope and Importance of Statistics in Economics.

**Unit II: Collection and Organisation of Data (Periods 10)**

- Collection of data — census and sampling methods; sources of data — primary and secondary.
- Organisation of data — frequency array and frequency distribution.

**Unit III: Presentation of Data (Periods 15)**

- Tables
- Diagrams — Geometric forms (bar-diagrams, pie-diagrams), Frequency diagrams (histogram, polygon and ogive), Arithmetic line-

graphs (time series graph).

**Unit IV: Condensation of Data (Periods 64)**

- Measures of Central Tendency — mean (simple arithmetic mean), median, quartile, mode.
- Measures of Dispersion — absolute dispersion (range, quartile deviation, mean deviation, standard deviation); relative dispersion (co-efficient of quartile-deviation, co-efficient of mean deviation, co-efficient of variation).
- Correlation — meaning, scatter diagram.
- Measures of correlation — Karl Pearson's method (two variables ungrouped data) Spearman's rank correlation.
- Introduction to Index Numbers — meaning, types — wholesale price index, consumer price index and index of industrial production, uses of index numbers.

**Unit V: Project for Application of Statistics in Economics (Periods 10)**

- Preparation of a Project Report on — consumer awareness amongst households through collection of primary data by designing a questionnaire.

Or

Productivity awareness amongst enterprises through use of statistical data from statistical tables from Newspapers/Economic Surveys/RBI Bulletin/Government Budget of the State/the Nation / Census Reports / NSS Reports, etc.

**Semester II****Indian Economic Development (Periods 104)****Unit I: Economic Growth and Development (Periods 14)**

- Concepts of Economic Growth, Economic Development, Sustainable Development and Quality of Life
- Indicators of Development: Per Capita Income; Quality-of-Life Index; Human Development Index.

**Unit II: Structural Changes in the Indian Economy Since Independence (Periods 45)**

- Structure of the Indian Economy at the time of independence — Occupational Structure, relative contribution of sectors (Agriculture, Industries and Service Sector) to National



Income, Infrastructure — Economic (energy, transport and communication) and Social (education, health and housing).

- Development Strategies till 1991: economic planning—meaning, main objectives; main features of economic policies; main achievements and failures.
- Economic Reforms since 1991: need and main features — liberalisation, globalisation, privatisation.

### **Unit III: Current Challenges Facing Indian Economy.** (Periods 45)

- Population – size, rate of growth and its implications for development; main measures taken to check the high rate of growth.
- Poverty — absolute, and relative (inequalities); main programmes for poverty alleviation.
- Unemployment – types.
- Infrastructure – Energy, Transport and Communication, Health, Education.
- Other emerging issues – Environment, Gender, and Migration (internal and international).

## **CLASS XII**

### **Semester III**

#### **Introductory Micro Economic Theory** (Periods 104)

##### **Unit I : Introduction** (Periods 10)

- What economics is all about?
- Central problems of an economy, production possibility curve, and opportunity cost
- Micro economics — meaning.

##### **Unit II : Consumer Behaviour and Demand** (Periods 25)

- Consumer's equilibrium — meaning
- Demand, market demand, determinants of demand, demand schedule, demand curve, movement along and shifts in demand curve, concepts of price elasticity of demand, measurement of price elasticity of demand – percentage, total expenditure and geometric methods.

##### **Unit III: Producer Behaviour and Supply** (Periods 24)

- Producer's equilibrium — meaning
- Supply, market supply, determinants of supply, supply schedule, supply curve,

movement along and shifts in supply curve, price elasticity of supply, measurement of price elasticity of supply – percentage and geometric method.

- Cost and Revenue : concepts of costs, short-run costs (fixed and variable costs; total, average and marginal costs); concepts of revenue, total, average and marginal revenue and their relationship.

##### **Unit IV : Forms of Market and Price Determination** (Periods 30)

- Forms of market – Perfect competition, Monopoly, Monopolistic competition – their meaning and features.
- Price determination under perfect competition – Equilibrium price, effects of shifts in demand and supply.

##### **Unit V : Factor Price Determination** (Periods 15)

- Demand for a factor – meaning, supply of a factor – meaning, determination of price of a factor under perfect competition.
- Differences in absolute and relative factor prices – meaning and effects on internal and international specialisation.

### **Semester IV**

#### **Introductory Macro Economics (Periods 104)**

##### **Unit I: Introduction** (Periods 4)

- Macro Economics – meaning, difference between Micro and Macro Economics

##### **Unit II: National Income and Related Aggregates: Basic Concepts and Measurement.** (Periods 30)

- Circular flow of income, concepts of GDP, GNP, NDP, NNP (at market price and factor cost), National Disposable Income (gross and net).
- Measurement of National Income – Value added method, Income method and Expenditure method.

##### **Unit III: Determination of Income and Employment** (Periods 25)

- Aggregate demand, aggregate supply and their components.



- Propensity to consume and propensity to save (average and marginal).
- Meaning of involuntary unemployment and full employment.
- Determination of income and employment.
- Concept of investment multiplier and its working.
- Problems of excess and deficient demand.
- Measures to correct excess and deficient demand – availability of credit, change in Government spending.

#### Unit IV: Money and Banking (Periods 20)

- Money - meaning and functions.
- Money supply - meaning.
- Commercial banks - meaning and functions.
- Central bank - meaning and functions.

#### Unit V: Government Budget and the Economy (Periods 15)

- Government budget – meaning and its components
- Classification of receipts – revenue and capital; classification of expenditure – revenue and capital, plan and non-plan, and developmental and non-developmental.
- Balanced budget, surplus budget and deficit budget – revenue deficit, fiscal deficit and primary deficit – meaning and implications.
- Objectives of government budget.

#### Unit VI: Balance of Payments (Periods 10)

- Foreign exchange rate— meaning and determination.
- Balance of payments account – its meaning and components.



# Sociology

Sociology is an elective subject at the secondary stage. It helps learners to understand the nature and character of the social structure. It helps to acquire those values which enable them to develop positive attitude towards a changing society. Hence the study of Sociology becomes useful at the higher

secondary stage. Sociology at this stage should be such that it is helpful to understand human behaviour in its complexities and manifestations. It should help learners to need answers and explanations to the questions that arise in their mind. It should help to understand social change.

At this stage, there is a need to develop an awareness of the social structure and the social structure in which they participate in the present society.

In order to strengthen the feeling of social equality along with a sense of social justice, the learners need to have a better understanding of the rich cultural heritage of India.

In a changing world the study of Sociology should help the students to familiarize themselves with the phenomenon of liberalisation, globalisation and their impact on society. This should help them to relate and interpret the developments in the new changing environment.

## Objectives

To enable learners to look at social reality objectively.

To develop among learners scientific temper and ability to perceive reality free from shackles of dogmatism and prejudices and its process of social transformation:

- To introduce them to basic concept of sociology.
- To build upon these concepts with reference to concrete situations in India, in particular and outside in general, so as to

promote understanding of the social structure and change.

- To make them familiar with the processes of development and change with special reference to social relationships.
- To make the learners realize the importance of continuity and change to enable them to contribute to social development of India.

## Curricular Concerns and Content Core Components

Study of Sociology is expected to instill among students an analytical and objective approach of the social structure and the process of social change. It studies the social institutions, social interaction, social behaviour and the complexities of social life. Some of the curricular components suggested in the National Curriculum Framework have been reflected in the syllabus of sociology at this stage and these include

- India's freedom struggle and social character;
- processes of national integration and nurturing national identity;
- India's common cultural heritage;
- equality of sexes;
- removal of social barriers;
- observance of small family norms, and
- inculcation of scientific temper.

## Course Structure

Keeping the above in view Sociology Course in the higher secondary stage, has been divided into four semesters of about six months each. The semesterwise distribution of the course is as below:

## CLASS XI

### Semester I

Introducing Sociology

### Semester II

Understanding Society







# Sociology

## Rationale

Sociology is introduced as an elective subject at the higher secondary stage. It helps learners to understand the nature and character of the society in which they live. It helps to acquire those life-skills that will enable them to develop positive attitude towards the changing society. Hence the study of Sociology becomes useful at the higher secondary stage.

The curriculum of Sociology at this stage should enable the individual to understand human behaviour in all its complexities and manifestations.

The learners of today need answers and explanations to satisfy the questions that arise in their minds while trying to understand social change. Therefore, there is a need to develop an analytical approach towards the social structure so that they can meaningfully participate in the process of social change. In order to strengthen the feeling of patriotism and nationalism along with a sense of pride in the Indian culture, the learners need to develop a clear understanding of the rich cultural heritage of India.

In today's fast changing world the study of Sociology will prepare the students to familiarize themselves with the phenomenon of liberalisation, globalisation and their impact on society. This will enable them to relate and interpret the demands of the new changing environment.

## Objectives

- To enable learners to look at social reality objectively
- To include among learners scientific temper and ability to perceive reality free from shackles of obscurantism and prejudices and its process of social transformation;
- To introduce them to basic concept of sociology;
- To elaborate upon these concepts with reference to concrete situations in India, in particular and outside in general, so as to

provide understanding of the social structure and change;

- To make them familiar with the processes of development and change with special reference to social relationships;
- To make the learners realize the importance of continuity and change to enable them to contribute to social development of India.

## Curricular Concerns and Common Core Components

Study of Sociology is expected to invite among students an analytical and objective approach of the social structure and the process of social change. It studies the social institutions, social interaction, social behaviour and the complexities of the present day society. Some of the curricular concerns highlighted in the National Curriculum Framework have been reflected in the syllabus of sociology at this stage and these include

- India's freedom struggle (its social character);
- promotion of national integration and nurturing national identity;
- India's common cultural heritage;
- equality of sexes;
- removal of social barriers;
- observance of small family norms, and
- inculcation of scientific temper.

## Course Structure

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### CLASS XI

#### Semester I

Introducing Sociology

#### Semester II

Understanding Society



**CLASS XII****Semester III**

Structure of Indian Society

**Semester IV**

Social Change in India

**Evaluation**

Semesterisation is recommended for this course. 40 per cent of the marks for each semester would be for continuous assessment and 60 per cent for the final examination.

In case there is no semesterisation, there will still be continuous and comprehensive evaluation of the students. 40 per cent of the marks will be allocated for the continuous evaluation and 60 per cent of the marks will be for the final examination. Continuous evaluation will be done through assignment and projects.

**CLASS XI****Semester I****Introducing Sociology (Periods 104)****Unit I: Sociology as a Discipline (Periods 20)**

- Origin, Nature and Scope of Sociology;
- Relationship with other Social Sciences – History, Political Science and Economics.

**Unit II: Basic Concepts (Periods 20)**

- Society
- Social Groups
- Social Control
- Culture

**Unit III: Social Institutions (Periods 22)**

- Marriage, family and Kinship
- Economy and Polity
- Religion and Culture
- Education

**Unit IV: Culture, Personality and Society (Periods 20)**

- Interpretations of Culture;
- Individual and Socialisation;
- Culture and Personality Formation.

**Unit V: Methods of Research and Techniques of Data Collection (Periods 22)**

- Methods: Historical, Comparative and Functional;

- Techniques: Observation, Case Study and ; Questionnaire.

**Semester II****Understanding Society (Periods 104)****Unit I: Social Structure and Stratification (Periods 18)**

- System, Structure and Function
- Caste, Class, Power, Gender and Ethnicity.

**Unit II: Social Processes and Social Change (Periods 20)**

- Social Processes : Cooperation, Accommodation, Assimilation, Competition and Conflict
- Social Change : Evolution, Progress and Revolution

**Unit III: Social Ecology (Periods 18)**

- Environment and Society
- Rural – Urban Nexus

**Unit IV: Contributions of (Periods 18)**

- Karl Marx
- Max Weber
- Emile Durkheim

**Unit V: Contributions of (Periods 20)**

- G.S. Ghurye
- D.P. Mukerji
- Radhakamal Mukherjee
- B.K. Sarkar

**Unit VI: Project Work (Periods 10)**

- Concerning different problems of the Indian Society and other related aspects.

**CLASS XII****Semester III****Structure of Indian Society (Periods 104)****Unit I: Unity and Diversity (Periods 20)****Unit II: Structure of Society (Periods 22)**

- Social Demography ;
- Rural-urban divides and Linkages
- Social, Economic and Cultural differentiations: Caste, Class and Tribe.

**Unit III: Institutional Structure (Periods 22)**

- Marriage, family and kinship



- Religions, educational and cultural institutions
- Political Institutions

**Unit IV: Deprived Groups** (Periods 20)

- The Scheduled Tribes, The Scheduled Castes and The Other Backward Classes
- Women
- Minorities

**Unit V: Approaches to the Study of Indian Society** (Periods 20)

- Indological/Cultural
- Structural/Historical

**Semester IV**

**Social Change in India** (Periods 104)

**Unit I: Processes of Social Change in India: Nature and Direction** (Periods 20)

- Structural Processes of change: Industrialisation, Urbanization and Modernisation,
- Cultural Processes of change: Sanskritisation, Westernisation & Secularization.

**Unit II: State and Social Change** (Periods 22)

- Constitutional Provisions
- Plan and Social Change
- Panchayati Raj Institutions
- Legislation and Social Change

**Unit III: Economic Development and Social Change** (Periods 20)

- Land Reforms and Green Revolution
- Globalisation and Liberalisation
- Emergence of New Groups and Classes

**Unit IV: Culture, Education and Mass Media** (Periods 22)

- Education and Social Change
- Mass Media and Culture Change
- Globalisation and Local Cultures

**Unit V: Dissent and Social Change** (Periods 20)

- Major Types of Social Movements
- Patterns of Social Deviance: Crime and Violence.

PSYCHOLOGY







# Psychology

## Objectives

The specific objectives of teaching psychology at Higher Secondary Stage are:

- To inculcate the learners with basic psychological concepts and methods in order to develop insightfulness about human mind and behaviour.
- To nurture some basic skills in observing human behaviour and familiarise the learners with some psychological tools and techniques.
- To facilitate the students' quest for personal growth and self-awareness.
- To help them become responsible citizens and develop ability to adjust and contribute towards the well-being of society.

## PSYCHOLOGY

(Periods: 90)

### Unit I: What is Psychology? (Periods: 10)

Introduction: Psychology as a science, Subject matter of psychology, Development of psychology as a modern discipline, Milestones in the History of Psychology, Scope of Psychology and life, Approaches to the study of psychology - Biological, Behavioural, Cognitive, Psychoanalytic, Humanistic and Socio-cultural, Fields of Psychology, Psychology in relation to other disciplines, New Frontiers of Psychology (Box).

### Unit II: Methods in Psychology (Periods: 14)

Integrative: Goals of psychological enquiry; Method of enquiry - Observational, Experimental, (Correlation of Method (Box); Simulation (Box); Cross Sectional and Longitudinal studies; Qualitative Methods (Box); Case Study, Psychological Tools - Tests, Interviews, Questionnaires, Ethical issues involved in psychological studies.

### Unit III: Biological Bases of Behaviour

(Periods: 14)

Introduction: Evolutionary perspective, Genes and behaviour, (Natural Selection and the evolution



PSYCHOLOGY



# Psychology

## Rationale

Psychology is a discipline specialising in the study of mental processes, experiences and behaviours of human beings in a socio-cultural context. It aims at understanding the complexities of these and related phenomena, and contributing towards individual and social well-being.

The contents of the course in Class XI aim at providing knowledge and understanding of the nature and determinants of basic psychological processes. The focus of the contents in Class XII is on application of various psychological concepts and processes in different domains of life and on development of skills.

## Salient Features

- The present course content aims at incorporating the newer developments in the field of psychology as well as relating them to the realities of Indian ethos.
- It makes provision for developing sensitivity and skills that may help the students in their daily life as well as in the world of work.
- The practicals have been geared towards undertaking various experiential activities such as projects, exercises, experiments, and psychological testing.
- The text has been visualised to be presented in an interactive mode so that the students become participative learners.
- The text would facilitate self-learning of students and would require use of different strategies by teachers. It would contain attractive and stimulating illustrations of concepts as well as situations suited to the Indian context.
- While emphasis, in principle, will be on real-life situations, supplementary and enrichment reading materials [in boxes] will be given to broaden the awareness and sustain interest and involvement with the subject matter.
- The material presented in the boxes shall not be included in evaluation.

## Objectives

The specific objectives of teaching psychology at Higher Secondary Stage are :

- To familiarise the learners with basic psychological concepts and methods in order to develop inquisitiveness about human mind and behaviour;
- To nurture some basic skills in observing human behaviour and familiarise the learners with some psychological tools and techniques;
- To facilitate the students' quest for personal growth and effectiveness;
- To help them become responsible citizens and develop ability to adjust and contribute towards the well-being of society.

## CLASS XI

### Semester I

(Periods 90)

#### Unit I : What is Psychology ?

(Periods 16)

Introduction; Psychology as a science; Subject matter of psychology, Development of psychology as a modern discipline; [*Milestones in the History of Psychology (Box)*]; Psychology and life; Approaches to the study of Psychology – Biological, Behaviouristic, Cognitive, Psychodynamic, Humanistic and Socio-cultural; Fields of Psychology; Psychology in relation to other disciplines; [*New Frontiers of Psychology (Box)*].

#### Unit II : Methods in Psychology

(Periods 14)

Introduction; Goals of psychological enquiry; Methods of enquiry – Observational, Experimental, [*Correlational Method (Box)*]; [*Simulation (Box)*]; Cross Sectional and Longitudinal studies; [*Qualitative Methods (Box)*]; Case Study, Psychological Tools – Tests, Interviews, Questionnaires; Ethical issues involved in psychological studies.

#### Unit III: Biological Bases of Behaviour

(Periods 14)

Introduction; Evolutionary perspective; Genes and behaviour; [*Natural Selection and Socio-Biology*]



(Box)]; Brain and Nervous System; [Reflexes (Box)]; Biology of behaviour : The Nervous System; [Communication in the Nervous System (Box)]; [Method of Studying Brain (MRI) (Box)]; [Neuro- Scientific Developments (Box)]; Endocrine system.

#### **Unit IV : Socio-Cultural Bases of Behaviour** (Periods 10)

Introduction; What is culture ? Relationship between culture and human behaviour; Socialisation and acculturation; Cultural organisation of social life; [Modernisation and Sanskritisation (Box)].

#### **Unit V: Life-Span Development**

(Periods 18)

Introduction; What is development ? [Growth Maturation, Development, Evolution (Box)]; Principles of development; Factors influencing development; Critical Periods of Development; Ecology of human development; Genetic bases of development; Stages of development; [Indian Concept of Stages of Development (Box)]; Infancy and Childhood—Developmental tasks and characteristics, [Childhood in India (Box)], Adolescence — characteristics and challenges; [Sex Role, Gender and Peer Relations (Box)]; Adulthood stages and challenges, Old age – coping with problems of the aged, Critical life events (Career planning, unemployment, marriage, divorce, single parenting, retirement, death and dying); [Family and Human Development (Box)].

#### **Unit VI : Sensory and Perceptual Processes**

(Periods 18)

Introduction; [Human Senses – Vision, Audition, Smell, Taste, Tactile, etc. (Box)]; [Psychophysics: Classical and Modern Methods (Box)]; Attentional processes; Determinants of attention; Features of attention; [Study on Selective Attention (Box)]; Attention and Perception; Perceptual processes; Principles of perceptual organization; [Illusion (Box)]; [Perceptual Constancy (Box)]; [Motivation and Perception (Box)]; Perception of depth and distance; Perception of Shape; Perception of Space; Motion perception; [Cultural Influences in Perception (Box)]; Person perception; Social perception; [Extra-Sensory and Subliminal Perception (Box)]; [Top-down and Bottom-up Processes (Box)]; [Perception and the States of Consciousness (Box)].

### **Semester II**

(Periods 90)

#### **Unit VII : Learning**

(Periods 18)

Introduction; What is learning ? How does one learn— Classical conditioning, Instrumental conditioning; [Comparisons of Two Types of Learning (Box) ]. Observational learning — Modelling and social learning, Verbal learning— associative and Organisational processes; Concept learning; [Artificial Concepts Versus Natural Categories (Box)]; Skill learning, Processes of learning— Extinction, Reinforcement, Generalisation and Discrimination, Transfer of learning generic and specific ; Determinants of learning (continuous vs. partial reinforcement, motivation, preparedness); [Learned Helplessness, Learned Indolence, Self Punitive Habits (Box)]; Factors influencing learning; Learning disability; Practical applications of learning principles.

#### **Unit VIII : Memory Processes**

(Periods 18)

Introduction; What is Memory ? (encoding, storage, retrieval); [Memory Research in Historical Perspective – Landmarks (Box) ]; Multiple memory systems; [Sensory, Short-Term/Working Memory (Box)]; Long term memory — Episodic and Semantic ; Levels of processing; Measurement of memory – Explicit and Implicit memory measures; Memory organisation – categories and hierarchical organisation, Construction and reconstruction in memory; [Eye Witness Memory (Box)]; [Special Memory Phenomenon (Box)]; Forgetting- Encoding failure, Storage failure and Retrieval failure; Amnesia; Improving memory; [Emotion and Memory (Box)].

#### **Unit IX : Cognitive Processes**

(Periods 14)

Introduction ; Information processing model; Measuring the mental processes; What is thinking?; Concepts : Reasoning, Problem-solving, Judgment and decision making, [Metacognition (Box)]; [Artificial intelligence (Box)]; Creative thinking; [Fostering Creativity (Box)]; [Assessing Creativity (Box)]; [Imagery and Cognition (Box) ]; [Cognitive Science (BOX)].

#### **Unit X : Language and Communication**

(Periods 14)

Introduction; Language – nature and characteristics (Linguistic universal, Linguistic structure and meaning) ;[Surface Structure and Deep Structure (Box)]; [Transformational Grammar (Box)]; Language comprehension ;Language production and



Language and thought; [*Language and Brain* (Box)]; [*Bilingualism - Role of Mother Tongue* (Box)]; Communication Process; Verbal and Non-verbal Communication; Communication skills and barriers in communication; [*Persuasion and Persuasive Communication* (Box)].

### Unit XI : Motivation and Emotion

(Periods 14)

Introduction; What is Motivation? Human needs; [*Maslow* (Box)]; [*Physiological Mechanisms : Hypothalamus and Motivation* (Box)]; Biological Needs; Major Psychological motives – Achievement, Affiliation and Power; Emerging Concepts – Intrinsic and Extrinsic motivation, Attribution, Competence, Frustration, Conflict, and Anxiety; [*Yerkes Dodsons Law* (Box)]; [*Enhancing Motivation* (Box)]; Nature of emotions; Expressing emotions; Physiological and cognitive basis of emotions; Relationship between emotion and motivation; Emotional competence; Culture and emotion; [*Examination Anxiety* (Box)].

### Unit XII: Facets of Development

(Periods 12)

Introduction; Cognitive development - Piaget's Theory [*Vygotsky Theory* (Box)]; Socio-emotional development – [*Temperament* (Box)]; Attachment, Parenting styles, [*Peer Group Relations* (Box)]; Stages of psycho-social development (Erikson); Moral development (Piaget, Kohlberg.); Development of values; [*Value Preferences in the Indian Context* (Box)]; Holistic development of child;

#### Practicals for Semesters I and II (Periods 60)

1. One project (Emphasis should be on the use of different methods of enquiry and related skills).
2. Three practicals related to the following areas :
  - Learning
  - Memory
  - Motivation
  - Perception
  - Attention
  - Thinking

## CLASS XII

### Semester III

(Periods 90)

#### Unit I : Intelligence

(Periods 18)

Introduction; What is intelligence ? Approaches

to understanding intelligence (Gardner, Sternberg, J.P.Das); [*Classical Approaches Towards Intelligence* (Box)]; Culture and intelligence; Assessment of intelligence; Intellectual Deficiency; Giftedness; [*New Directions – Emotional, Practical and Spiritual Intelligences* (Box)]; Special abilities: Aptitude (nature and measurement).

#### Unit II : Self and Personality

(Periods 18)

Introduction; Concepts of self and personality; Self-concept and self-regulation; [*Culture and Self* (Box)]; The Indian concept of self; Approaches to the study of personality- Typological; Psychodynamic, Humanistic, [*New Advances-Cognitive, Five Factor Model* (Box)]; [*Type 'A', Type 'B' and Type 'C' Personalities* (Box)], Concept of 'Gunas'; Assessment of personality – Projective measures, Self-report measures and Behavioural Analysis.

#### Unit III: Social Influence and Group Processes

(Periods 14)

Introduction; Nature and formation of groups; Types of group; Factors influencing group formation; Conformity, Compliance and Obedience; Influence of group on individual behaviours; social facilitation; risk taking, [*Group Think* (Box)]; [*Minority Influence* (Box)]; Leadership – Nature and Functions. Leadership styles; Cooperation and Competition.

#### Unit IV : Attitude and Social Cognition

(Periods 14)

Introduction; Nature and components of attitudes; Attitude and behaviour; Attitude measurement; Attitude formation and change; Prejudice and Discrimination; Inter group conflicts; Strategies for handling prejudices; Making attributions; Belief and its functions; Pro-social behaviour- Nature and Determinants; [*Bystander Behaviour, Al-Truism, Empathy*] (Box)]; [*Aggression and Violence-Nature, Determinants and Management* (Box)].

#### Unit V: Coping with Life Challenges

(Periods 10)

Introduction; What is adjustment?; Nature and sources of stress; Types of stress; Coping with stress; [*Stressful Life Events* (Box)]; Healthy life style; [*Learned Resourcefulness and Learned Helplessness* (Box)]; [*Optimism and Thriving* (Box)]; Factors facilitating Positive health and Well-being.

#### Unit VI : Psychological Disorders (Periods 16)

Introduction; What is abnormal behaviour?



Classification of Disorders; [DSM System (Box)]; [Perspectives on Understanding Abnormal Behaviour (Box)]; Causal factors underlying abnormal behaviour; Major Disorders - Anxiety Disorders; [Epidemiology of Mental Illness (Box)]; [Post-Traumatic Stress Disorder (Box)]; Mood Disorders; Schizophrenic Disorders; Substance related Disorders; Behavioural Disorders; Personality disorders; [Regulations Pertaining to Mental Health (Box)]. [HIV-AIDS (Box)].

#### **Semester IV**

(Periods 90)

#### **Unit VII : Therapeutic Approaches ( Periods 18)**

Introduction; Nature and Process of Therapy; Types of Therapies - Bio-Medical, Cognitive, Psycho-dynamic, Behavioural; Indigenous Therapies - Yoga, [Reiki and Pranic Healing (Box)]; Meditation; [Limitations of Therapy (Box)]. Rehabilitation of mentally ill.

#### **Unit VIII: Environment and Behaviour**

(Periods 14 )

Introduction; Man-environment relationship; [Personal, Space and Territoriality (Box)]; Environmental stresses and their effects - Noise pollution, Crowding; Natural disasters; Promoting pro-environmental behaviours; [Recycling and Energy Conservation (Box)]; [Green House and Nuclear Threat (Box)]; [Tragedy of Commons (Box)].

#### **Unit IX: Psychology in Organisational Setting**

(Periods 14)

Introduction: Structure and functions of organisations;; Personnel selection; Training; Performance Appraisal; Work Motivation; Advertising and Marketing; [Human Resource Development (HRD) (Box)].

#### **Unit X: Psychology and Social Problems**

( Periods 12)

Introduction; Social Problems - Poverty, Social

disadvantages; Challenges for National Integration; Gender discrimination; Population explosion, Impact of media and communication revolution and Urbanisation.

#### **Unit XI: Skills Needed for an Effective Psychologist**

( Periods 14)

Introduction; Developing as a psychologist - Interviewing Skills, Counselling Skills [Case Study (Box)], Testing Skills, Communication Skills; [Organizing Rehabilitation Services for - Physically, Mentally and Socially Challenged (Box)]; [Empathy, Self-Discipline (Box)].

#### **Unit XII: Statistics in Psychology ( Periods 18)**

Introduction; What is Statistics ? [Use of Statistics (Box)]; Types of statistics - Descriptive, Inferential; Levels of measurement; Graphical representation of data - Bar, Polygon, Histogram, Computation of measures of central tendency; Concept of variability- Range and Standard Deviation; Concept of Correlation; [Rank Order and Product Moment (Box)]; Concept of Normal Distribution Curve.

#### **Practicals for Semester III and IV ( Periods 60)**

The students shall be required to conduct five practicals and prepare one case profile related to the topics covered in the course. They will involve use of psychological assessment devices (Standardized tests should be used) in different domains and conducting small studies, exercises, experiments, etc.

- Intelligence
- Personality
- Aptitude
- Adjustment
- Attitude
- Self-concept
- Anxiety



# Business Studies

**Rationale**

The Business Studies course is a large or +2 stage in the curriculum. The curriculum pattern is a bridge between the general education of the preceding stage and the specialised areas of learning in the higher stage. The course contents at this stage are designed to prepare students to pursue higher education and to enter the workforce at the professional level.

The Business Studies course for two years of schooling students is designed to provide a foundation in Business Studies. The course is designed against this background. It is designed to provide that at this stage instructions in Business Studies are given in such a manner that students develop a basic understanding of the principles and practices of business, trade and industry and its relationship to society.

The Business Studies course is designed to provide a foundation in Business Studies. The course is designed against this background. It is designed to provide that at this stage instructions in Business Studies are given in such a manner that students develop a basic understanding of the principles and practices of business, trade and industry and its relationship to society.

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## Objectives

- To develop in students an understanding of the processes of business and its environment;
- To acquaint students with the dynamic nature and inter-dependent aspects of business;
- To help students appreciate the economic and social significance of business activity and the social costs and benefits arising therefrom;
- To acquaint students with the practice of managing the operations and resources of business;
- To prepare students to function more effectively and responsibly as consumers, employees, employers and citizens;
- To help students develop the foundation for the study of business and its environment;
- To develop in students the necessary attitude and skills to be able to deal with the business environment.

## Curricular Content and Core Competencies

The National Curriculum Framework for School Education (2005) has outlined certain curricular content. This has been incorporated in the Business Studies syllabus keeping in view the nature of the course.

- Developing national identity through a course which is understanding of people's contribution to the world;
- Developing the value development - the core values are truth, righteousness, conduct, peace, love and non-violence;
- Respecting the freedom of globalisation;
- Sharing the challenges of information technology and communication;
- Minimising environmental risks and pollution;
- Maximising employment opportunities.

## Course Objectives

The Business Studies syllabus is designed to provide a foundation in Business Studies.



Unit VI: **Psychological Assessment** (10 weeks)  
 Introduction: History and Evolution of Psychological Assessment  
 Types of Psychological Assessment: Intelligence, Personality, Achievement, Aptitude, Projective, Clinical, Neuropsychological, Cross-Cultural, and Assessment of Learning Disabilities  
 Psychological Assessment: Principles and Procedures  
 Psychological Assessment: Applications and Challenges  
 Psychological Assessment: Research and Practice  
 Psychological Assessment: Ethics and Professional Standards

Unit VII: **Psychological Assessment** (10 weeks)  
 Introduction: History and Evolution of Psychological Assessment  
 Types of Psychological Assessment: Intelligence, Personality, Achievement, Aptitude, Projective, Clinical, Neuropsychological, Cross-Cultural, and Assessment of Learning Disabilities  
 Psychological Assessment: Principles and Procedures  
 Psychological Assessment: Applications and Challenges  
 Psychological Assessment: Research and Practice  
 Psychological Assessment: Ethics and Professional Standards

Unit VIII: **Psychological Assessment** (10 weeks)  
 Introduction: History and Evolution of Psychological Assessment  
 Types of Psychological Assessment: Intelligence, Personality, Achievement, Aptitude, Projective, Clinical, Neuropsychological, Cross-Cultural, and Assessment of Learning Disabilities  
 Psychological Assessment: Principles and Procedures  
 Psychological Assessment: Applications and Challenges  
 Psychological Assessment: Research and Practice  
 Psychological Assessment: Ethics and Professional Standards

Unit IX: **Psychological Assessment** (10 weeks)  
 Introduction: History and Evolution of Psychological Assessment  
 Types of Psychological Assessment: Intelligence, Personality, Achievement, Aptitude, Projective, Clinical, Neuropsychological, Cross-Cultural, and Assessment of Learning Disabilities  
 Psychological Assessment: Principles and Procedures  
 Psychological Assessment: Applications and Challenges  
 Psychological Assessment: Research and Practice  
 Psychological Assessment: Ethics and Professional Standards

Unit X: **Psychological Assessment** (10 weeks)  
 Introduction: History and Evolution of Psychological Assessment  
 Types of Psychological Assessment: Intelligence, Personality, Achievement, Aptitude, Projective, Clinical, Neuropsychological, Cross-Cultural, and Assessment of Learning Disabilities  
 Psychological Assessment: Principles and Procedures  
 Psychological Assessment: Applications and Challenges  
 Psychological Assessment: Research and Practice  
 Psychological Assessment: Ethics and Professional Standards

Advantages: Challenges for Gender discrimination; Popularity of media and communication; Rehabilitation.

Unit XI: **Skills Needed for a Psychologist**

Interpersonal: Developing a Therapeutic Relationship; Interviewing Skills; Counseling Skills; Testing Skills; Conducting Research; Rehabilitation Skills; Diversity and Socially Challenging Discipline (Bod).

Unit XII: **Statistics in Psychology**  
 Introduction: What is Statistics? Types of statistics - Descriptive Statistics; Inferential Statistics; Levels of measurement: Nominal, Ordinal, Interval, Ratio; Measures of central tendency: Mean, Median, Mode, Range and Standard Deviation; Correlation; Rank Order Correlation; Concept of Normal Distribution.

## BUSINESS STUDIES

Students will be able to understand and prepare various topics covered in the course. The use of psychology in business is a very important area of study. Standardized tests are used in many areas and conducting research is a very important part of the course.

- Intelligence
- Personality
- Aptitude
- Adjustment
- Attitude
- Self-concept
- Anxiety



# Business Studies

## Rationale

The Higher Secondary Stage or +2 stage in the structure of our education pattern is a bridge between general education of the preceding secondary stage and specialised areas of learning. Therefore, the course contents at this stage should enable students to pursue higher education at the university level or at the professional level.

During the first ten years of schooling students are not given formal instructions in Business Studies and Accountancy. Against this background, it becomes necessary that at this stage instructions in these subjects be given in such a manner that students have a good understanding of the principles and practices bearing in business, trade and industry and their relationship to society.

Business is a dynamic process that brings together technology, natural resources and human initiative in a constantly changing global environment. To understand the *Framework* in which a business operates a detailed study of the organisation and management of business processes and its interaction with the environment is required. Information Technology is becoming a part of business operations. Computerised systems are fast replacing other systems. E-commerce and other related concepts, therefore, have to be introduced as part of the curriculum.

Business Studies will prepare students to analyse, manage, evaluate and respond to changes which affect business. It provides a way of looking at and interacting with the business environment. It recognises the fact that business influences and is influenced by social, political, legal and economic forces. It allows students to appreciate that business is an integral component of society and develop an understanding of many social and ethical issues.

Therefore, to acquire basic knowledge of the business world, a course in Business Studies would be useful. It also informs students of a range of study and work options and bridges the gap between school and work.

## Objectives

- To develop in students an understanding of the processes of business and its environment;
- To acquaint students with the dynamic nature and inter-dependent aspects of business;
- To help students appreciate the economic and social significance of business activity and the social costs and benefits arising therefrom;
- To acquaint students with the practice of managing the operations and resources of business;
- To prepare students to function more effectively and responsibly as consumers, employers, employees and citizens;
- To help students in making the transition from school to the world of work including self-employment;
- To develop in students a business attitude and skills to be precise and articulate.

## Curricular Concerns and Core Components

The *National Curriculum Framework for School Education* (2000) has outlined certain curricular concerns. These have been incorporated in the Business Studies syllabus keeping in view the nature of the content.

- Strengthening national identity through a conscious understanding of India's contribution to the world
- Education for value development – the core universal values are truth, righteous conduct, peace, love and non-violence
- Responding to the impact of globalisation
- Meeting the challenges of Information Technology and Communication
- Nurturing entrepreneurial skills among students
- Integrating indigenous knowledge.

## Course Structure

The Business Studies syllabus has been divided



into 4 semester courses at the higher secondary stage. Each semester would be for about six months duration.

## CLASS XI

### Semester I

Foundations of Business

### Semester II

Corporate Organisation, Finance and Trade

## CLASS XII

### Semester III

Principles and Functions of Management

### Semester IV

Business Finance and Marketing

### Evaluation

Semesterisation is recommended for this course, 40 per cent of the marks for each semester would be for continuous assessment and 60% for the final examination.

In case there is no semesterisation, there will still be continuous and comprehensive evaluation. Sixty per cent of the marks will be allocated for continuous evaluation and forty per cent of the marks will be for the final examination.

## CLASS XI

### Semester I

**Foundations of Business** (Periods 104)

#### Unit I: Nature and Purpose of Business

(Periods 20)

- Concept and characteristics of business
- Business, profession and employment – distinctive features
- Objectives of business – economic and social
- Business risks – nature and causes
- Role of profit in business
- A brief outline of the evolution of business activities in India

#### Unit II: Social Responsibility of Business and Business Ethics

(Periods 14)

- Concept of social responsibility
- Case for social responsibility and human rights

- Responsibility towards different interest groups: owners/investors, employees, consumers, government, community and public in general
- Business and environmental protection
- Business ethics: concept and elements.

#### Unit III: Structure of Business

(Periods 14)

- Classification of business activities: industry and commerce
- Industry and types: primary, secondary, tertiary
- Trade and types
- E-Commerce – Meaning, opportunities and benefits, resources required for successful e-commerce implementation, security and safety of business transactions
- Outsourcing of services : nature, need for and types : Financial Services, Advertising, Courier Services, Customer Support Services.

#### Unit IV: Service Sector and Business

(Periods 18)

- Banking, Finance and Insurance
- Nature and types of financial services
- Types of Banks, Functions of Commercial Banks.
- Insurance : Principles, types : life and general (fire and marine) and insurance of other risks : health insurance, fidelity insurance
- Communication
- Postal, Telecom
- Recent trends in mode of communication – meaning and uses of fax, Internet and e-mail
- Warehousing: types and functions.

#### Unit V: Forms and Formation of Business Enterprises

(Periods 24)

- Meaning features, merits and limitations of following forms:
  - Sole Proprietorship
  - Joint Hindu Family Business
  - Partnership – partnership deed (main clauses) types of partners and partnership formation, registration, .
  - Cooperative Societies
  - Company: types of Companies – Private, Public and deemed Public privileges of private company.



- Choice of form of business enterprise
- Factors to be considered for starting a business
- Scope of setting up small business enterprises.

#### **Unit VI: Sectoral Organisation of Business** (Periods 14)

- Private Sector and Public Sector
- Forms of organizing public sector enterprises
  - Departmental Undertaking
  - Statutory Corporation
  - Government Company
- Changing role of public sector
- Global Enterprises (Multinational Companies): meaning and features

### **Semester II**

#### **Corporate Organisation, Finance and Trade** (Periods 104)

#### **Unit VII: Formation of a Company** (Periods 16)

- Stages in the formation of a company :
  - Promotion,
  - Incorporation, and
  - Commencement of business.

#### **Unit VIII: Sources of Business Finance** (Periods 30)

- Nature and significance
- Types of business finance and their uses: Long, medium and short-term
- Sources of finance – owners funds and borrowed funds
- Meaning and characteristics of the following sources:
  - Equity and Preference shares
  - Debentures/Bonds – types (secured, unsecured; convertible, non-convertible)
  - Retained profits
  - Public deposits
- International sources: GDRs, ADRs, FDI
- Institutional finance – objectives, types of finance provided by public financial institutions, finance companies, Non-Banking Finance Companies (NBFCs), Investment trusts and mutual funds, Institutional finance for small business (SIDBI).

- Special financial assistance available to industries in rural, backward and hilly areas.

#### **Unit IX: Internal Trade** (Periods 20)

- Meaning and types.
- Wholesale trade-functions and services.
- Retail trade organisation, meaning, types features, merits and limitations.
  - Itinerant and fixed shop.
  - Departmental store, chain store, mail order business, franchise, consumer's co-operative store (including super bazaar),
- Direct marketing, Tele-marketing, Internet marketing.

#### **Unit X: External Trade** (Periods 18)

- Nature and importance
- Means of Export Promotion
- Incentives available
- Export -Import procedure and documentation
- Nature and importance of Export Processing Zones and Economic Zones

#### **Suggestive/Illustrative Projects** (Periods 20)

- Find out from local sample business unit(s) the various objectives they pursue
- Problems of setting up and running business units
- Enquiry into the ethics of running business through questionnaires
- Survey of quality of bank services in the local branch office
- Study of postal and courier mail services
- Availability and use of agency services advertising, packaging, investments in savings schemes, etc.
- Survey of the popularity of credit cards issued by different banks
- Study the profile of a sole trader/partnership commenting up on the nature and working of business
- Study of a Joint Hindu Family business
- Study of the working of any cooperative society
- Study of a small business unit regarding source of finance
- Nature of different traders (like hawkers and peddlars) in a specific locality in issue of goods, capital investment, turnover



- Study of weekly bazaar in a locality
- Study of franchise retail store
- Study of export/import of any article
- Problems of women entrepreneurs in business
- Waste/garbage disposal
- Study of pavement trade
- Prepare a scrapbook and collect articles on the changing role of public sector and any other topics related to the syllabus.

## CLASS XII

### Semester III

#### Principles and Functions of Management (Periods 124)

##### Unit I: Nature and significance of Management (Periods 14)

- Management – concept, objectives, importance
- Management as an activity, process, discipline, and as a group.
- Nature of management, as a science, as an art, and as a profession.
- Management and administration – different views on the usage of the terms..
- Levels of management – top, middle, supervisory
- Management functions- planning, organising staffing, directing and controlling.
- Coordination – nature and importance.

##### Unit II: Principles of Management (Periods 14)

- Principles of Management – meaning, nature and significance
- Fayol's principles of management.
- Scientific Management – Principles and Techniques.

##### Unit III: Business Environment (Periods 14)

- Business Environment – meaning and importance
- Dimensions of Business Environment – Political, Economic, Social, Legal-regulatory
- Economic Environment in India. Impact of government policy changes on business and industry with special reference to liberalisation and globalisation (since 1991)
- Managerial response to changes in business environment.

##### Unit IV: Planning (Periods 14)

- Meaning, features, importance
- Goals, Objectives, Policy, Procedure, Methods, Rules, Budget and Programmes – meaning and distinction
- Planning process
- Limitations of planning.

##### Unit V: Organizing (Periods 20)

- Meaning and importance
- Steps in the process of organizing
- Structure of organization – functional and divisional
- Formal and informal organization
- Delegation: Meaning and importance
- Elements of delegation
- Meaning and importance of decentralisation
- Difference between delegation and decentralisation

##### Unit VI: Staffing (Periods 20)

- Meaning, need and importance of staffing
- Staffing as a part of Human Resource Management
- Steps in staffing process
- Recruitment- meaning and sources
- Selection – meaning, process
- Training and Development- meaning, need, and distinction, methods – job rotation, apprenticeship, vestibule, internship.
- Types of compensation and incentives – monetary and non monetary
- Methods of wage payment – time rate and piece rate

##### Unit VII: Directing (Periods 16)

- Meaning and importance
- Elements of Direction:
  - Supervision – meaning and importance
  - Motivation – meaning hierarchy of needs and importance of motivation
  - Leadership – meaning, importance, qualities of a good leader
  - Communication - meaning and importance, formal and informal communication and barriers to effective communication.

##### Unit VIII: Controlling (Periods 12)

- Meaning and importance



- Relationship between planning and controlling
- Steps in the process of control

#### **Semester IV**

#### **Business Finance and Marketing (Periods 80)**

##### **Unit IX: Financial Management** (Periods 20)

- Meaning, objectives and finance function
- Financial planning – meaning and importance
- Capital Structure – meaning and factors
- Capitalisation – over and under, causes and effects
- Fixed and Working Capital – meaning and factors affecting both
- Determinants of dividend decision

##### **Unit X: Capital Market** (Periods 16)

- Concept and nature of capital market – primary and secondary market
- Money market
- Distinction between capital market and money market
- Stock Exchange – meaning, functions NSEI, OCTEI, - nature and purpose
- Securities and Exchange Board of India (SEBI)–Objectives and Functions

##### **Unit XI: Marketing Management** (Periods 32)

- Marketing management – marketing concept and objectives
- Distinction between marketing and selling
- Marketing functions
- Marketing mix – elements
  - Product – product mix, branding, labelling and packaging
  - Price – pricing strategies
  - Place – physical distribution and channels of distribution, factors determining choice of channels
  - Promotion – sales promotion – concept and methods
    - advertising – features, media, choice of media, objections to advertising
    - personal selling – features
- Public Relations – concept

##### **Unit XII: Consumer Protection** (Periods 12)

- Importance of consumer protection
- Consumer rights
- Consumer responsibilities
- Ways and means of consumer protection – Consumer awareness and legal redressal with special reference to Consumer Protection Act.
- Role of consumer organisations and NGOs







# Accountancy

## Objectives

- To familiarise the students with accounting as an information accounting system.
- To develop an understanding about recording of transactions through accounting equation approach.
- To develop the skill of using accounting system for processing business transactions.
- To acquaint the students with basic concepts of data base management in the context of accounting information system.
- To enable the students to analyse and understand the financial statements and
- To familiarise students with the fundamentals of computerised system of accounting.

## Curricular Goals and Core Competencies

Education has assigned certain competencies for School Education. The following competencies have been incorporated in the accountancy syllabus keeping in view the nature of content.

- Learning Information with life skills
- Value Development
- Meeting the challenges of Information Technology and Communication
- Preparedness to the impact of globalisation
- Interpersonal skills development

## Course Structure

Accountancy in Babus has been divided into four semesters courses at the higher secondary stage. Each semester would be for about six months duration.

### CLASS XI

#### Semester I

Financial Accounting - I

#### Semester II

Financial Accounting - II

# ACCOUNTANCY







# Accountancy

## Rationale

Business education has undergone a tremendous change in the wake of liberalisation and globalisation. The school education programme does not necessarily provide any kind of formal teaching in business and accountancy, till the tenth standard.

With the fast changing economic scenario and business environment in a state of continuous flux, elementary business education along with accountancy as the language of business has carved out a place for itself at the higher secondary stage. Its syllabus content should give students a firm foundation in basic accounting principles and also keep them informed of changes in its methodology concerning particular aspects of the subject.

Against this background, the thrust of the course has been directed towards developing a basic understanding of the nature and purpose of the accounting information and its role in the conduct of business operations. This would help to develop among students logical reasoning, careful analysis and considered judgement, limited only to the initiation level of the subject.

Accounting as an information system aids in providing financial information concerning performance of business enterprise. The emphasis at Class XI is placed on basic concepts and the process of accounting leading to the preparation of accounts for a sole proprietorship firm. In Class XII, accounting for partnership firms and some other aspects relating to company accounts are to be taught as a compulsory part and analysis of financial statements or computerised accounting as an optional part.

Computerised accounting is becoming more and more popular with increased awareness about use of computers in business. Keeping this in view, the students are exposed to basic knowledge about computers and its use in accounting at Class XI. Students will also be given an opportunity to understand further about computerised accounting in Class XII.

## Objectives

- To familiarise the students with accounting as an information accounting system;
- To develop an understanding about recording of transactions through accounting equation approach;
- To develop the skill of using accounting equation in processing business transactions;
- To acquaint the students with basic concepts of data base management in the context of accounting information system;
- To enable the students to analyse and understand the financial statements; and
- To familiarise students with the fundamentals of computerised system of accounting.

## Curricular Concerns and Common Core Components

The *National Curriculum Framework for School Education* has outlined certain curricular concerns. The following concerns have been incorporated in the accountancy syllabus keeping in view the nature of content.

- Linking Education with life-skills
- Value Development
- Meeting the challenges of Information Technology and Communication
- Responding to the impact of globalisation
- Entrepreneurial skills development.

## Course Structure

Accountancy syllabus has been divided into four semester courses at the higher secondary stage. Each semester would be for about six months duration.

### CLASS XI

#### Semester I

Financial Accounting – I

#### Semester II

Financial Accounting – II



**CLASS XII****Semester III**

Partnership and Company Accounts

**Semester IV**

Analysis of Financial Statements

or

Computerised Accounting

**Evaluation**

Semesterisation is recommended for this course. Forty per cent of the marks for each semester would be for continuous assessment and Sixty per cent for the final examination.

In case there is no semesterisation, there will still be continuous and comprehensive evaluation. Sixty per cent of the marks will be allocated for continuous evaluation and Forty per cent of the marks will be for the final examination.

In Computerised Accounting twenty Marks will be for the Practical Examination.

**CLASS XI****Semester I****Financial Accounting – I** (Periods 104)**Unit I: Introduction to Accounting** (Periods 12)

- Accounting – Meaning, Objectives, Types of Accounting Information, Advantages and Limitations
- Qualitative Characteristics of Accounting Information: Reliability, Relevance, Understandability and Comparability.
- Basic Accounting Terms: Business Transaction, Capital, Drawing, Liability, Asset, Revenue, Expenditure, Expense, Income, Losses and Gains, Purchases, Sales, Stock, Debtors, Receivables, Creditors, Payables.

**Unit II: Theory Base of Accounting** (Periods 12)

- Basic Assumptions: Accounting Entity, Money Measurement: Going Concern, Accounting Period.
- Basic Principles: Duality, Verifiability and Objectivity of Evidence, Historical Cost Revenue Recognition, Matching, Full Disclosure.
- Modifying Principles: Materiality, Consistency, Prudence, Timeliness, Substance Over Form,

Variations in accounting practices.

- Accounting Standards: Meaning, nature and need.

**Unit III: Generation of Vouchers and Recording of Transactions** (Periods 20)

- Origin of Transactions – Source Documents and Vouchers, Preparation of Vouchers.
- Accounting Equation – Meaning and Analysis of transactions using Accounting Equation.
- Rules of Debit and Credit: for Assets, for Liabilities, for Capital, for Revenue, and for Expense.
- Double Entry Book Keeping, Books of Original Entry, Meaning, Format and Recording of entries: Journal. Special Purpose Books: Meaning, Utility, Format and Recording therein.
  - (i) Cash Book – Simple, Cashbook with Bank column and Petty cashbook.
  - (ii) Purchase Book, Sales Book, Purchase Returns Book, Sales Returns Book, Bills Receivable Book and Bills Payable Book.
- Ledger – Meaning, Utility, Format, Posting from Journal, Cashbook and other Special Purpose Books, Balancing of accounts.
- Bank Reconciliation Statement: Meaning, Need and Preparation with Correct Cash Balance.

**Unit IV: Trial Balance and Rectification of Errors** (Periods 20)

- Trial Balance: Meaning, Objectives and Preparation.
- Errors: Types of Errors. Errors affecting Trial Balance and Errors not affecting Trial Balance.
- Detection and Rectification of Errors.
- Suspense Account – Meaning, Utility, Preparation and Treatment of Suspense Account Balance.

**Unit V : Depreciation, Provisions and Reserves** (Periods 20)

- Depreciation: Meaning and Need for charging depreciation, Factors affecting depreciation, Methods of depreciation – Straight Line method, Written Down Value method (excluding change in method), Method of recording depreciation: By charging to asset account, By creating provision for depreciation/accumulated depreciation account. Asset Disposal Account.



- Provisions and Reserves: Meaning & Importance, Need for provision for doubtful debts, provision for discount on debtors, Difference between provisions and Reserves. Types of Reserves: Revenue Reserve, Capital Reserve, General Reserve and Specific Reserve.

#### **Unit VI : Bills of Exchange** (Periods 20)

- Bills of Exchange and Promissory Note: Definition, Features, Parties, Specimen, Distinction.
- Important Terms: Term of Bill and Days of Grace, Date of Maturity, Bill at Sight, Bill after date, Negotiation, Endorsement, Discounting of bill, Dishonour of bill, Noting of bill, Insolvency of Acceptor, Retirement and Renewal of a bill
- Accounting Treatment of bill transactions.

### **Semester II**

#### **Financial Accounting – II** (Periods 104)

#### **Unit VII: Financial Statements** (Periods 32)

- Financial Statements: Meaning and Users.
- Profit and Loss Account: Gross profit, Operating profit and Net profit.
- Balance Sheet: Need, Grouping, Marshalling of Assets and Liabilities.
- Adjustments in preparation of financial statements with respect to closing stock, outstanding expenses, prepaid expenses, accrued income, income received in advance, depreciation, bad debts, provision for bad debts, provision for discount on debtors, managers' commission, abnormal loss, goods sent for approval and in transit.
- Preparation of Profit and Loss Account and Balance Sheet of sole proprietorship concern.

#### **Unit VIII : Financial Statement of Not-for-Profit Organisation** (Periods 24)

- Not for profit organisation: Meaning and examples
- Receipts and payments account. Income and Expenditure account : Meaning and Concept of Fund based and Non-Fund based accounting.
- Preparation of Income and Expenditure account and Balance Sheet from Receipt and Payment Account with additional information.

#### **Unit IX : Accounts from Incomplete Records** (Periods 24)

- Incomplete Records: Meaning, Uses and Limitations
- Ascertainment of Profit /Loss by Statement of Affairs Method.
- Preparation of Trading and Profit and Loss Account and Balance Sheet (with reference to missing figures in total debtors account, total creditors account, B/R, B/P and cash book and opening statement of affairs).

#### **Unit X : Database Design for Accounting** (Periods 24)

- Introduction to Computers : Meaning, Capabilities and Components of Computer System.
- Database concepts.
- Entity Relationship Model and its enhancements.
  - Relational Data Model.
  - Concept of Normalisation – Need and Practical rules.
  - Structured Query Language (SQL)- Basic queries.

### **CLASS XII**

#### **Semester III**

#### **Partnership and Company Accounts** (Periods 124)

#### **Unit I : Accounting for Partnership** (Periods 14)

- Nature of Partnership Firm: Partnership Deed (Meaning, Impact)
- Special Aspects of Final Accounts of Partnership : Fixed v/s Fluctuating Capital, Division of Profit among partners, Past Adjustments and Guarantee of Profits. Accounting for Joint Life Policy.

#### **Unit II: Reconstitution of Partnership** (Periods 36)

Change in Profit Sharing Ratio among the existing partners – Sacrificing Ratio and Gaining Ratio.

- Accounting for Revaluation of Assets and Liabilities and Distribution of Reserves and Accumulated Profits.

Goodwill : Nature, Factors affecting and Methods of valuation : average profit, super profit,



Multiplier and Capitalisation, accounting treatment of goodwill.

- *Admission of a Partner* : Effect of Admission of Partner, Change in Profit Sharing Ratio-Sacrificing Ratio. Accounting Treatment of Goodwill. Accounting Treatment for Revaluation of Assets and Liabilities, Accounting Treatment of Reserves and Accumulated Profits, Adjustment of Capital Accounts.
- *Retirement/Death of a Partner* : Change in Profit Sharing Ratio - Gaining Ratio. Accounting Treatment of Goodwill. Accounting Treatment for the Revaluation of Assets and Liabilities. Adjustment of Accumulated Profits and Reserves, Adjustment of Joint Life Policy and Capital Accounts.

### Unit III : Dissolution of Partnership Firm

(Periods 20)

- Meaning, Settlement of Accounts: Preparation of Realisation account and related accounts (excluding piecemeal distribution, sale to a company and insolvency of a partner)

### Unit IV : Accounting for Share Capital

(Periods 28)

- Share and Share Capital : Meaning, Nature and Types
- Accounting for Share Capital: Issue and Allotment of Equity and Preference Shares. Private Placement and Public Subscription of share capital. Over subscription and Under subscription, Issue at par, premium and at discount, Calls in advance, Calls in arrears, Interest on Calls in advance and arrears and under subscription, Issue of Shares for consideration other than cash.
- Forfeiture of Shares : Accounting Treatment, Re-issue of Forfeited Shares.
- Disclosure of Share Capital in company's balance sheet.

### Unit V : Accounting for Debentures

(Periods 26)

- Issue of Debentures: Meaning of Debentures, Issue of Debentures at par and at a premium, Issue of Debentures for consideration other than cash, Debentures as a Collateral Security.
- Redemption of Debentures : Meaning, Sources of funds for redemption of debentures : from

the proceeds of fresh issue of share capital and debentures, Out of accumulated profits and Sinking Fund.

- Methods of redemption of debentures : In lump-sum at the end of stipulated period, By draw of lots, By purchasing in the open market, By conversion into new debentures or shares.

## Semester IV

### Analysis of Financial Statements (Periods 84)

#### Unit I : Analysis of Financial Statements

(Periods 42)

- Financial Statements of a Company : Balance Sheet of a Company in the prescribed form with major headings only (Schedule VI).
- Financial Analysis : Meaning, Significance and Purpose, Limitations.
- Tools for Financial Analysis : Comparative Statements, Common Size Statements.
- Accounting Ratios : Meaning and Objectives.

Types of Ratios:

*Liquidity Ratios* : Current Ratio, Liquid Ratio.

*Solvency Ratio* : Debt to equity, Total Assets to Debt, Proprietary Ratio.

*Activity Ratio* : Inventory Turnover, Debtors Turnover, Payables Turnover, Working Capital Turnover.

*Profitability Ratio* : Gross Profit, Operating ratio.

#### Unit II : Statement of Changes in Financial Position

(Periods 42)

- Cash Flow Statement: Meaning and Objectives, Preparation, Adjustments related to depreciation, dividend and tax, sale and purchase of non-current assets ( as per revised standard issued by ICAI )
- Statement of changes in Financial position on Working Capital Concept.

OR

## Semester IV

### Computerised Accounting (Periods 84)

#### Unit I: Overview of Computer System

(Periods 10)

- Fundamentals of Computerised Accounting System.



- Concept of Grouping of Accounts
- Codification of Accounts, Maintaining the hierarchy of ledger.

**Unit II : Application of Computers in Financial Accounting** (Periods 50)

- Accounting procedures used in practice for recording cash, bank, and journal transactions using appropriate vouchers

- Preparation of ledger accounts, cashbook, bankbook.
- Trial Balance.

**Unit III : Accounting Applications Using Electronic Spreadsheet** (Periods 24)

- Payroll Accounting
- Loan Repayment Schedule
- Depreciation

PHYSICS







# Physics

Physics is the most crucial part of school education as it is the most differentiated curriculum. It is a subject being offered as an integral part of secondary stage of education. The students take up this subject with a purpose of pursuing higher sciences or professional courses in engineering, technology or in applied areas of science at tertiary level. There is a need for teachers with sufficient conceptual understanding which would enable them to meet the challenges of the modern courses after the

content, useful in real-life situations for making Physics learning more relevant, meaningful and interesting.

- Emphasis on use of SI Units, Symbols, nomenclatures of physical quantities and formulations as per international standards.
- Emphasis on Physics-related technological/ industrial aspects to keep up with changing demand of society committed for the use of Physics, technology and infrastructure.
- Providing vertical continuity of the concepts from secondary to higher secondary stage thereby bridging the gap and also the horizontal continuity across the concepts.
- Providing logical sequencing of the ideas of the subject matter and proper placement of the content with their relevance for better learning and understanding the concepts at the desired level of the students.

## PHYSICS

Following are the key features of the new curriculum as an exercise based on the vision of the school system about the future. It is a particular material, large volume of content, and also the educational content and issues presented in the curriculum Framework for School Education.

The curriculum Framework for School Education has recommended the Semester pattern of study, or emphasis the need for a more diversified and diverse curriculum in education and the use of information technology as an integral part of the learning process, with the aim of making it more relevant. Also, it is essential to develop the higher secondary stage of education for better learning and establishing relationship between the school and life skills.

The curriculum Framework for School Education has recommended the Semester pattern of study, or emphasis the need for a more diversified and diverse curriculum in education and the use of information technology as an integral part of the learning process, with the aim of making it more relevant. Also, it is essential to develop the higher secondary stage of education for better learning and establishing relationship between the school and life skills.

Emphasis on inclusion of fundamental knowledge and skills, understanding of Physics and technology, and also developing concepts and respect towards the environment, particularly towards the logical reasoning for their contribution in the field of Physics and Technology. Reducing the content is achieved by eliminating overlapping of concepts/reports within the discipline of Physics or with other disciplines, reducing the descriptive portion and providing suitable formulation/depth of treatment appropriate to the conceptual level of learners, taking out obsolete and redundant content without affecting the overall continuity of concepts, and making room for contemporary extensions and emerging areas in Physics.

The new topics in the emerging areas such as Dual nature of Radiation and Matter, Information Technology, Optical communication, Optics, use of laser, space satellite communication and other communication systems which find their use applications in everyday life are appropriately covered in the







# Physics

## Rationale

The higher secondary stage is the most crucial and challenging stage of school education as it is a transition from general undifferentiated curriculum to specialised discipline-based, content area-oriented courses. Physics is being offered as an elective subject at the higher secondary stage of school education. At this stage, the students take up Physics, as a discipline, with a purpose of pursuing their future careers in basic sciences or professional courses (medicine, engineering, technology), and studying courses in applied areas of science and technology at tertiary level. There is a need to provide the learners with sufficient conceptual background of Physics which would eventually make them competent to meet the challenges of academic and professional courses after the higher secondary stage.

The present effort of reforming and updating the Physics curriculum is an exercise based on the feedback received from the school system about existing syllabus and curricular material, large expansion of Physics knowledge, and also the educational and curricular concerns and issues provided in the *National Curriculum Framework for School Education* (2000).

The *National Curriculum Framework for School Education* has recommended the Semester pattern of education. It further emphasizes the need of integrating core components and diverse curricular concerns, value education and the use of information and communication technology as an integral part of teaching-learning process, with the subject area of study. Also, it is essential to develop linkages between the higher secondary stage and the tertiary level curricula for better learning of Physics concepts and establishing relationship with daily-life situations and life-skills.

## Salient Features

- Emphasis on basic conceptual understanding of content
- Promoting process-skills, problem-solving abilities and applications of Physics concepts/

content, useful in real-life situations for making Physics learning more relevant, meaningful and interesting.

- Emphasis on use of SI Units, Symbols, nomenclature of physical quantities and formulations as per international standards.
- Emphasis on Physics-related technological/industrial aspects to cope up with changing demand of society committed to the use of Physics, technology and informatics.
- Providing vertical continuity of the concepts from secondary to higher secondary stage thereby bridging the gap, and also the horizontal or lateral coverage of concepts.
- Providing logical sequencing of the 'Units' of the subject matter and proper placement of concepts with their linkages for better learning and matching the concepts/content with comprehension level of the learners.
- Emphasis on inclusion of indigenous knowledge and Indian contribution to Physics and technology and also developing reverence and respect towards great scientists, particularly towards the Indian scientists for their contribution in the field of Physics and Technology.
- Reducing the curriculum load by eliminating overlapping of concepts/content within the discipline of Physics or with other disciplines; reducing the descriptive portion and providing suitable formulation/depth of treatment appropriate to the comprehension level of learners; taking out obsolete and redundant content without affecting the overall continuity of concepts, and making room for contemporary core-topics and emerging curricular areas in Physics.
- The core-topics in the emerging areas such as Dual nature of Radiation and matter, Information Technology, Optical communication (optical fibre, use of lasers), space/satellite communication and other communication systems which find immense applications in everyday life are appropriately covered in the



syllabus.

- The entire course content is divided into four semesters. The first and second semesters are meant for Class XI and the third and fourth semesters for Class XII. The syllabus is arranged in Units spread over two years duration. The Units are so sequenced as to provide different dimensions of Physics as a discipline. The time allocation for learning Physics content per Unit in terms of instructional periods have been mentioned for each Unit to help the writing team members to develop the instructional material so as to cover it within the time frame. Each Unit has been arranged with a topic, content related practical work (one experiment and two short activities to be evaluated) and suggested investigatory projects (one project, based on the content of Classes XI and XII, to be evaluated in the fourth semester). There is an imperative need for evaluating the learners through Continuous and Comprehensive Evaluation of various concepts covered in a Unit and in each semester. For certification purposes, evaluation in the fourth semester should be done through a public examination.

### Objectives

The Physics curriculum at the higher secondary stage attempts to:

- Strengthen the concepts developed at the secondary stage to provide firm ground work and foundation for further learning Physics at the tertiary level more effectively and learning the relationship with daily-life situations;
- Develop conceptual competence in the learners so as to cope up with professional courses in future career;
- Expose the learners to different processes used in Physics-related industrial and technological applications;
- Develop process-skills and experimental, observational, manipulative, decision-making and investigatory skills in the learners;
- Promote problem-solving abilities and creative thinking to develop interest in the learners in the study of Physics as a discipline;
- Understand the relationship between nature and matter on scientific basis, develop positive scientific attitude, and appreciate the contribution of Physics towards the improvement of quality of life and human welfare;

- Physics teaching at the higher secondary stage enables the learners to comprehend the contemporary knowledge and develop aesthetic sensibilities and process skills. The experimental skills and process-skills developed together with conceptual Physics knowledge prepare the learners for more meaningful learning experiences and contribute to the significant improvement of quality of life. The learners would also appreciate the role and impact of Physics and Technology, and their linkages with overall national development;
- In the following, the complete syllabus is divided into four semesters.

### Course Structure

#### CLASS XI

##### Semester I

###### Theory

Unit I Physical World and Measurement

Unit II Kinematics

Unit III Laws of Motion

Unit IV Work, Energy and Power

Unit V Motion of System of Particles and Rigid Body

###### Practicals

##### Semester II

###### Theory

Unit VI Gravitation

Unit VII Mechanics of Solids and Fluids

Unit VIII Heat and Thermodynamics

Unit IX Oscillations

Unit X Waves

###### Practicals

#### CLASS XII

##### Semester III

###### Theory

Unit I Electrostatics

Unit II Current Electricity

Unit III Magnetic Effects of Current and Magnetism

Unit IV Electromagnetic Induction and Alternating Currents

Unit V Electromagnetic Waves

###### Practicals

##### Semester IV

###### Theory

Unit VI Optics

Unit VII Atoms and Nuclei



Unit VIII Dual Nature of Radiation and Matter

Unit IX Semi-conductor Devices

Unit X Communication Systems

**Practicals**

## CLASS XI

### Theory

#### Semester I

#### Unit I: Physical World and Measurement

(Periods 10)

Physics-scope and excitement; Physics, technology and society. Forces in nature, conservation laws; Examples of gravitational, electromagnetic and nuclear forces from daily-life experiences (qualitative description only).

Need for measurement; Units of measurement; Systems of units; SI units, Fundamental and derived units, Length, mass and time measurements; Accuracy and precision of measuring instruments, Errors in measurement; Significant figures.

Dimensions of physical quantities, dimensional analysis and its applications.

#### Unit II: Kinematics (Periods 28)

Motion in a straight line, Position-time graph, speed and velocity. Uniform and non-uniform motion, average speed and instantaneous velocity.

Uniformly accelerated motion, velocity-time, position-time graphs. relations for uniformly accelerated motion (graphical treatment).

Elementary concepts of differentiation and integration for describing motion.

Scalar and vector quantities; Position and displacement vectors, general vectors and notation; Equality of vectors, multiplication of vectors by a real number; Addition and subtraction of vectors; Unit vector, Resolution of a vector in a plane-Rectangular components, Multiplication of vectors-scalar and vector products; vectors in three dimensions (elementary idea only).

Motion in a plane, Cases of uniform velocity and uniform acceleration – Projectile motion, Uniform circular motion.

#### Unit III: Laws of Motion (Periods 16)

Force and inertia, Newton's first law of motion; Momentum, Newton's second law of motion, Impulse; Newton's third law of motion; Law of conservation of linear momentum and its applications; Equilibrium of concurrent forces; Static and Ki-

netic friction, laws of friction, rolling friction, lubrication; Examples of variable-mass situation.

Dynamics of uniform circular motion; Centripetal force, examples of circular motion (vehicle on level circular road, vehicle on banked road); Inertial and non-inertial frames (elementary idea).

#### Unit IV: Work, Energy and Power (Periods 18)

Work done by a constant force and a variable force; Kinetic energy, Power; Work-energy theorem.

Notion of Potential energy, potential energy of a spring, conservative forces; conservation of mechanical energy (Kinetic and potential energies), Non-conservative forces; elastic and in-elastic collisions in one and two dimensions.

Different forms of energies in nature, Mass-energy equivalence (qualitative idea only).

#### Unit V: Motion of System of Particles and Rigid Body (Periods 18)

Centre of mass of a two-particle system, generalisation to N particles, momentum conservation and centre of mass motion, Application to some familiar systems; centre of mass of a rigid body.

Moment of a force, Torque, angular momentum, physical meaning of angular momentum, conservation of angular momentum with some examples (Planetary motion).

Equilibrium of rigid bodies, rigid body rotation and equation of rotational motion, comparison of linear and rotational motions; Moment of inertia and its physical significance, radius of gyration, parallel and perpendicular axes theorems (statements without proofs); Moment of inertia of circular ring, disc, cylinder, sphere, and thin straight rod; Rolling of cylinder without slipping.

Examples of Binary systems in nature (Binary Stars, Earth-moon system, diatomic molecules).

### Semester II

#### Unit VI: Gravitation (Periods 14)

The universal law of gravitation, Gravitational constant; Acceleration due to gravity and its variation with the altitude, latitude, depth, and rotation of the earth; Mass of the earth.

Gravitational potential energy near the surface of the earth, gravitational potential; Escape velocity, orbital velocity of satellite, Weightlessness, motion of satellite, geostationary and polar satellites; Statement of Kepler's laws of planetary motion; proof of second and third law (circular orbits); Inertial and Gravitational mass.



**Unit VII. Mechanics of Solids and Fluids**

(Periods 24)

States of matter, Inter-atomic and inter-molecular forces.

**(A) Solids**

Elastic behaviour, Stress-Strain relationship, Hooke's law, Young's modulus, bulk modulus, shear, modulus of rigidity, some practical examples.

**(B) Fluids**

Pressure due to a fluid column, Pascal's law and its applications (hydraulic lift and hydraulic brakes), Effect of gravity on fluid pressure, Buoyancy, floatation and Archimedes' principle; Viscosity, Stokes' law, Terminal velocity, Streamline flow, Reynold's number, Bernoulli's theorem and its applications.

Surface energy and surface tension, angle of contact, application of surface tension ideas in (i) formation of drops and bubbles, (ii) capillary rise, (iii) action of detergents.

**Unit VIII: Heat and Thermodynamics**

(Periods 24)

Kinetic theory of gases – assumptions, concept of pressure, Kinetic energy and temperature; Mean, rms and most probable speed, degrees of freedom, law of equipartition of energy (statement only), concept of mean free path, Avogadro's number.

Thermal equilibrium and temperature (zeroth law of thermodynamics), Heat, work and internal energy; Thermal expansion-thermometry; First law of thermodynamics, specific heat, specific heat of gases at constant volume and pressure (monatomic, diatomic gases); specific heat of solids (Dulong and Petit's law).

Thermodynamic variables and equation of state, phase diagrams; ideal gas equation, isothermal and adiabatic processes; reversible and irreversible processes; Carnot engine and refrigerator or heat pump, Efficiency and coefficient of performance of heat engines; second law of thermodynamics (statement only) and some practical applications.

Transfer of heat-conduction, convection and radiation; Thermal conductivity of solids; Black body radiation – Kirchhoff's law, Wien's displacement law, Stefan's law (statements only); Newton's law of cooling; solar constant and surface temperature of the sun.

**Unit IX: Oscillations**

(Periods 14)

Periodic motion – period, frequency, displacement as a function of time and periodic functions, Simple harmonic motion (S.H.M.) and its equation; Phase, uniform circular motion and simple harmonic motion; oscillations of a spring-restoring force and force constant; Energy in S.H.M. – Kinetic and potential energies; Simple pendulum-derivation of expression for its time period; Free, forced and damped oscillations (qualitative ideas only), resonance; coupled oscillations.

**Unit X: Waves**

(Periods 14)

Longitudinal and transverse waves, wave motion, speed of wave motion, Displacement relation for a progressive wave; Principle of superposition of waves, Reflection of waves, standing waves in strings and pipes, fundamental mode and harmonics, Beats, Doppler effect; speed of sound in media.

**Practicals****Semester I****Experiments**

1. Use of Vernier Callipers
  - (i) to measure diameter of a small spherical/cylindrical body.
  - (ii) to measure dimensions of a given regular body of known mass and hence find its density.
  - (iii) to measure internal diameter and depth of a given beaker/calorimeter and hence find its volume.
2. Use of Screw-gauge
  - (i) to measure diameter of a given wire.
  - (ii) to measure thickness of a given sheet.
3. Use of Spherometer
  - (i) to measure thickness of a given sheet, and
  - (ii) to measure radius of curvature of given spherical surface.
4. To determine the mass of two different objects using a beam balance.
5. To find the weight of a given body using parallelogram law of vectors.
6. Using a simple pendulum
  - (i) plot  $L-T^2$  graph, and
  - (ii) hence find acceleration due to gravity.
7. To study the relationship between force of limiting friction and normal reaction and to find



the co-efficient of friction between a block and a horizontal surface.

### Activities

1. To make a paper scale of given least count, e.g. 0.2cm, 0.5cm.
2. To find the least count of a given apparatus/gadget/device (burette, thermometer, stopwatch, measuring tape, etc.) and take one measurement.
3. To plot a graph for a given set of data, with proper choice of scales and error bars.
4. To measure the force of limiting friction for rolling of a roller on a horizontal plane.
5. To study the variation in the range of a jet of water with the angle of projection.
6. To study the conservation of energy of a ball rolling down on inclined plane (using a double inclined plane).
7. To study collision of two balls in two-dimensions.
8. To study dissipation of energy of a simple pendulum by plotting a graph between square of amplitude and time.

### Semester II

#### Experiments

1. To determine Young's modulus of the material of a given wire using Searle's apparatus.
2. To find the spring constant of a helical spring by method of oscillations.
3. To find the spring constant of a helical spring from the load-extension graph.
4. To determine the surface tension of water by capillary rise method.
5. To determine the co-efficient of viscosity of a given viscous liquid by measuring the terminal velocity of a given spherical body.
6. To study the relationship between the temperature of a body and time as it cools.
7. To study the relation between frequency and length of a given wire under constant tension using sonometer.

or

To study the relation between the length of a given wire and tension for constant frequency using sonometer.

8. To find the velocity of sound in air at room temperature using a resonance tube by two-resonance position method.

### Activities

1. To find the atmospheric pressure using Fortin's barometer.
2. To observe and explain the effect of heating on a bi-metallic strip.
3. To note the change in level of liquid in a container on heating and interpret the observations.
4. To study the effect of detergent on surface tension by observing capillary rise.
5. To study the factors affecting the rate of loss of heat of a liquid.
6. To study the effect of nature of surface on emission and absorption of radiation.

## CLASS XII

### Theory

#### Semester III

##### Unit I: Electrostatics

(Periods 22)

Frictional electricity, charges and their conservation; Coulomb's law – Forces between two point electric charges, Forces between multiple electric charges; Superposition principle and continuous charge distribution.

Electric field and its physical significance, electric field due to a point charge, electric field lines; Electric dipole, electric field due to a dipole and behaviour of dipole in a uniform electric field.

Electric potential-physical meaning, potential difference, electric potential due to a point charge, a dipole and system of charges; Equipotential surfaces, Electrical potential energy of a system of two point charges and of electric dipoles in an electrostatic field.

Electric flux, statement of Gauss's theorem and its applications to find field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell (field inside and outside).

Conductors and insulators, presence of free charges and bound charges inside a conductor; Dielectrics and electric polarisation, general concept of a capacitor and capacitance, combination of capacitors in series and in parallel, energy stored in a capacitor, capacitance of a parallel plate capacitor with and without dielectric medium between the plates; Van de Graff generator.

##### Unit II: Current Electricity

(Periods 22)

Electric current, flow of electric charges in a me-



tallic conductor, drift velocity and mobility, and their relation with electric current; Ohm's law, electrical resistance, V-I characteristics, Exceptions of Ohm's law (Non-linear V-I characteristics), electrical resistivity and conductivity, classification of materials in terms of conductivity; Superconductivity (elementary idea) ; Carbon resistors, colour code for carbon resistors; combination of resistances – series and parallel.

Temperature dependence of resistance.

Internal resistance of a cell, Potential difference and emf of a cell, combination of cells in series and in parallel.

Kirchhoff's laws - illustration by simple applications, Wheatstone bridge and its application for temperature measurements, Metre bridge - special case of wheatstone bridge.

Potentiometer – principle and applications to measure potential difference, and for comparing emf of two cells.

Electric power, thermal effects of current and Joule's law; Chemical effects of current–Faraday's laws of electrolysis; Electro-chemical cells - Primary (Voltaic, Leclanche, Dry, Daniel), and secondary – rechargeable cells (lead accumulator, alkali accumulators), solid states cells.

Thermoelectricity – origin, elementary ideas of Seebeck, Thomson and Peltier effects; Thermo-couple, Thermo emf, neutral and inversion temperatures.

### **Unit III: Magnetic Effects of Current and Magnetism** (Periods 22 )

Concept of magnetic field, Oersted's experiment, Biot-Savart law, magnetic field due to an infinitely long current carrying straight wire and a circular loop; Ampere's circuital law and its application to straight and toroidal solenoids; Force on a moving charge in uniform magnetic and electric fields, Cyclotron; Force on current – carrying conductor in a uniform magnetic field, Forces between two parallel current-carrying conductors-definition of ampere; Torque experienced by a current loop in a uniform magnetic field, moving coil galvanometer – its current sensitivity and conversion to ammeter and voltmeter.

Current loop as a magnetic dipole and its magnetic dipole moment; Magnetic dipole moment of a revolving electron; Magnetic field intensity due to magnetic dipole (bar magnet) along the axis and perpendicular to the axis; Torque on a magnetic dipole (bar magnet) in a uniform magnetic field; Bar magnet as an equivalent solenoid, Magnetic

field lines; Earth's magnetic field and magnetic elements; Para-dia-and ferro-magnetic substances with examples, Electromagnets and permanent magnets.

### **Unit IV: Electromagnetic Induction and Alternating Currents** (Periods 18)

Electromagnetic induction, Faraday's law, Induced emf and current, Lenz's law, Eddy currents, self and mutual inductance.

Alternating currents, peak and rms value of alternating current/voltage, reactance and impedance; LC oscillations, LCR series circuit (Phasor diagram) – Resonant circuits and Q-factor; Power in AC circuits, wattless current.

AC generator and Transformer.

### **Unit V: Electromagnetic Waves** (Periods 7)

Electromagnetic waves and their characteristics (qualitative ideas only); Transverse nature of electromagnetic waves.

Electromagnetic spectrum (Radio-micro-waves, infra-red, optical, ultraviolet, X-rays, gamma rays) including elementary facts about their uses; Propagation of electromagnetic waves in atmosphere.

## **Semester IV**

### **Unit VI: Optics** (Periods 26)

Reflection of light–curved mirrors, mirror formula; Refraction of light, total internal reflection and its applications, spherical lenses, thin lens formula, lens maker's formula; Magnification, Power of a lens, combination of thin lenses in contact; Refraction and dispersion of light due to a prism, spectrometer and its uses for determination of refractive index of the material of prism, Rainbow; Scattering of light – Blue colour of the sky and reddish appearance of the sun at sun-rise and sunset.

Optical instruments – Human eye, camera, Compound microscope, astronomical telescope and their magnifying powers.

Wave front and Huygen's principle; Reflection and refraction of plane wave at a plane surface using wave fronts (qualitative idea); Interference - Young's double slit experiment and expression for fringe width, coherent sources and sustained interference of light; Diffraction - diffraction due to a single slit, width of central maximum, difference between interference and diffraction; Resolving power of microscope and telescope; Polarisation



- plane polarised light, Nicol prism, Brewster's law; Uses of plane polarised light and polaroids.

### Unit VII: Atoms and Nuclei (Periods 18)

Alpha-scattering experiment; Rutherford model of the atom, Bohr's model, energy quantisation.

Hydrogen spectrum – energy level diagrams; excitation and ionisation potentials; emission and absorption spectra; X-ray emission, Moseley's law and atomic number.

Spontaneous and Stimulated emission – Maser and Laser.

Composition and size of a nucleus, atomic masses, isotopes, isobars and isotones; Mass-energy relation, mass defect, binding energy per nucleon and its variation with mass number; Nature of the nuclear forces.

Radio-activity - alpha-, beta- and gamma-radiations and their properties; Radio-active decay law, half-life and disintegration constant; Simple explanation of  $\alpha$ -,  $\beta$ - and  $\gamma$ - decay; Nuclear reactions – Nuclear fission and fusion; Energy source of stars (concept only).

### Unit VIII: Dual Nature of Radiation and Matter (Periods 8)

Photo-electric effect, Einstein's photo-electric equation, Particle nature of light, photo-cells and their applications.

Matter waves – wave nature of particles, de Broglie relation, de Broglie wavelength of an electron, Davisson and Germer experiment.

Elementary idea of electron microscope.

### Unit IX: Semi-Conductor Devices (Periods 18)

Energy bands in solids (qualitative ideas only), difference between metals, insulators and semi-conductors using band theory; Intrinsic and extrinsic semi-conductors, p-n junction, Semi-conductor diode – characteristics in forward and reverse bias, diode as a rectifier, solar cell, photo-diode, LED, zener diode as a voltage regulator; Junction transistor, transistor action, characteristics of a transistor; Transistor as an amplifier (common emitter configuration) and oscillator; Logic gates (OR, AND, NOT, NAND and NOR); Elementary ideas about I.C.

### Unit X: Communication Systems (Periods 20)

Elementary ideas of analog and digital communication: Need for modulation; simple amplitude modulation and detection; Merits of digital com-

munication; Data transmission and reception; Principle of Fax and Modems.

Space Communication : Sky and space wave propagation; Satellite communication; Application in Remote Sensing.

Line Communication : 2-wire lines, cables, telephone links; optical communication (optical fibre, use of Laser), elementary principle of light modulation.

### Practicals

#### Semester III

#### Experiments

1. To establish current-voltage relationship (Ohm's law) for a metallic conductor and find its resistance.
2. To find resistance of a given wire using metre bridge/post office box and hence determine the specific resistance of its material.
3. To verify the laws of combination (series/parallel) of resistances using a metre bridge/post office box.
4. To compare the emf's of two given primary cells using potentiometer.
5. To determine the internal resistance of given primary cell using potentiometer.
6. To determine resistance of a galvanometer by half-deflection method and to find its figure of merit.
7. To convert the given galvanometer (of known resistance of figure of merit) into an ammeter/voltmeter of desired range and to verify the same.
8. To find the frequency of the a.c. mains with a sonometer.

#### Activities

1. To measure the resistance and impedance of an inductor with or without iron core.
2. To measure resistance, voltage (AC/DC), current (AC) and check continuity of a given circuit using multimeter.
3. To assemble a household circuit comprising three bulbs, three (on/off) switches, a fuse and a power source.
4. To assemble the components of a given electrical circuit.
5. To assemble given resistors in a suitable combination to obtain a desired resistance and



verify its value with a multimeter.

6. To find current by measuring voltage across a given resistor.
7. To draw the diagram of a given open circuit comprising at least a battery, resistor/rheostat, key, ammeter and voltmeter. Mark the components that are not connected in proper order and correct the circuit and also the circuit diagram.

## Semester IV

### Experiments

1. To find the value of  $v$  for different values of  $u$  in case of a concave mirror and to find the focal length.
2. To find the focal length of a convex lens by plotting graphs between  $u$  and  $v$  or between  $1/u$  and  $1/v$ .
3. To find the focal length of a convex mirror, using a convex lens.
4. To find the focal length of a concave lens, using a convex lens.
5. To determine angle of minimum deviation for a given prism by plotting a graph between the angle of incidence and the angle of deviation.
6. To determine refractive index of a glass slab using a travelling microscope.
7. To draw the characteristic curve of a p-n junction in forward bias and to determine its static and dynamic resistance.
8. To draw the characteristic curve of a zener diode and to determine its reverse break down voltage.
9. To study the characteristics of a common emitter npn or pnp transistor and to find out the values of current and voltage gains.

### Activities

1. To study effect of intensity of light (by varying distance of the source) on an L.D.R.
2. To identify a diode, an LED, a transistor, and IC, a resistor and a capacitor from mixed collection of such items.
3. Use of multimeter to
  - (a) identify base of transistor.
  - (b) distinguish between npn and pnp type transistors.
  - (c) identify terminal of an IC.

(d) see the unidirectional flow of current in case of a diode and an LED.

(e) check whether a given electronic component (e.g. diode, transistor or IC) is in working order.

4. To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab.
5. To observe polarisation of light using two polaroids.
6. To find refractive index of water using a concave mirror or convex lens.
7. To observe diffraction of light due to a thin slit between sharp edges of razor blades.
8. To study the nature and size of the image formed by a convex lens using a candle and a screen (for different distances of the candle from the lens).
9. To study the nature and size of the image of a candle formed by a concave mirror on a screen.

### Suggested Investigatory Projects

1. To investigate whether the energy of a simple pendulum is conserved.
2. To determine the radius of gyration about the centre of mass of a metre scale used as a bar pendulum.
3. To investigate changes in the velocity of a body under the action of a constant force and determine its acceleration.
4. To compare effectiveness of different materials as insulators of heat.
5. To determine the wavelength of laser beam by diffraction.
6. To study various factors on which the internal resistance/emf of a cell depends.
7. To construct a time-switch and study dependence of its time constant on various factors.
8. To study infra-red radiations emitted by different sources using photo-transistor.
9. To compare effectiveness of different materials as absorbers of sound.
10. To design an automatic traffic signal system using suitable combination of logic gates.
11. To study luminosity of various electric lamps of different powers and make.
12. To compare the Young's modulus of elasticity of different specimens of rubber and also draw their elastic hysteresis curve.



# Chemistry

## CHEMISTRY







# Chemistry

## Rationale

Chemistry is offered as an elective subject at higher secondary stage of school education. Students come to this stage after 10 years of general education and offer chemistry with a purpose of pursuing their career in basic sciences, competing and offering professional courses like medicine, engineering, technology and studying courses in applied areas of science and technology at tertiary level. Many of them may also enter in the world of work and higher secondary may be a terminal stage for them. The existing syllabus of chemistry at higher secondary stage is in vogue for the last 12 years. During this period, not only subject knowledge has increased but also many societal and pedagogical issues also have emerged out on the scene. The *National Policy on Education* (1986) and its subsequent review in 1992 made it further imperative to consider various issues related to environment, population, industry, agriculture, conservation of natural resources, health and nutrition and population and give a fresh look to these issues in an integrated manner. No doubt, curriculum renewal is a continuous process in view of its dynamic nature and, of course, there is a need of revising the curriculum after every 4-5 years in view of various issues, concerns and emergence of new subject areas. However, these issues need to be adequately addressed through teaching of different subject areas at appropriate stages of school education. *National Curriculum Framework for School Education* (2000) brought out by NCERT in 2000 addresses various issues and concerns and provides necessary directions and guidelines for renewal of curriculum and curricular materials. The present exercise of curriculum renewal in chemistry at higher secondary stage is based on this *Framework*. Feedback received from the School System and from other sources about the existing chemistry syllabus, textbooks and related curricular materials is another important input, which further helped in rectifying the existing weaknesses in chemistry syllabus.

At higher secondary stage, students have to cope up with the demand of society committed to use of science, technology and informatics. Considering these aspects students have to be equipped with problem-solving abilities and life-skills and have to be made competent enough to face challenges of globalisation and privatisation and make appropriate uses of information and communication technology.

During the last one decade, there is an exponential increase in chemical knowledge and many concepts are being redefined in the light of new experimentation and new research findings. Even at international level, new formulations and nomenclature of elements and compounds, symbols and units of physical quantities floated by scientific bodies like IUPAC, IUPAP and CGPM are of immense importance and need to be addressed and incorporated in the chemistry syllabus and textbooks of higher secondary stage. Chemistry has undergone tremendous changes in its content and methodology. Information and communication technology has become an integral part of the teaching learning process. There is a major shift from descriptive content *knowledge to concept and skill development*. Laboratory exercises are also being influenced by the modern techniques and electronic devices, and there is an adequate blending of information and communication technology and practical laboratory experiments. Many new areas like synthetic materials, bio-molecules, natural resources, consumer chemistry, industrial chemistry are coming in a big way and are becoming an integral part of *Chemistry Syllabus* normally taught at higher secondary stage. All these aspects have been considered and incorporated in this syllabus of chemistry. Although some background of chemistry in secondary school science is assumed, however, no specific knowledge of topic in chemistry is presupposed. The course is self-contained and broadly covers fundamentals of chemistry. Student's ability to solve problems will be based on these fundamentals.



**Salient features**

- Emphasis on fundamental concepts
- Promoting problem-solving skills
- Emphasis on new nomenclature, symbols, formulations and use of physical quantities as per international standards.
- Chemistry is not only facts and theory but also modern applications in the world around us. Emphasis is to be given on chemistry related technological/industrial aspects.
- 'Units' of the subject matter are provided in a logical sequencing. Physical Chemistry oriented portion supposed to provide base for interpreting facts are provided in the beginning itself.
- Description of all main topics of the theory (mole concept, stoichiometry, basic theory of chemical bonding, equilibrium, thermodynamics, kinetics and electrochemistry) are to serve the broadest possible population of students.
- The total syllabus is divided into *four* semesters. Each semester is of 90 periods for theory and 30 periods for practicals.
- An effort has been made, based on feedback, to remove obsolescence in content and repetition besides reducing the content by suitably integrating the different content areas.

**Objectives**

- to promote understanding of basic facts and concepts in chemistry while retaining the excitement of chemistry;
- to make students capable of studying chemistry in academic and professional courses (such as medicine, engineering, technology) at tertiary level;
- To expose the students to various emerging new areas of chemistry and apprise them with their relevance in their future studies and their application in various spheres of chemical sciences and technology;
- To equip students to face various challenges related to health, nutrition, environment, population, weather, industries and agriculture;
- To develop problem-solving skills in students.
- To expose the students to different processes used in industries and their technological applications;

- To apprise students with interface of chemistry with other disciplines of science such as physics, biology, geology, engineering, etc;
- To acquaint students with different aspects of Chemistry used in daily-life;
- To develop an interest in students to study Chemistry as a discipline.

**Course Structure****CLASS XI****Semester I****Theory**

- Unit I Some basic Concepts of Chemistry
- Unit II States of Matter
- Unit III Atomic Structure
- Unit IV Classification of elements and periodicity in properties
- Unit V First law of thermodynamics and chemical energetics
- Unit VI Chemical bonding and molecular structure
- Unit VII Equilibrium I – Equilibrium processes and phase equilibria
- Unit VIII Equilibrium II – Ionic Equilibrium in solutions
- Unit IX Redox reactions

**Practicals****Semester II****Theory**

- Unit X Principles and processes of extraction of elements
- Unit XI Hydrogen
- Unit XII s-Block Elements
- Unit XIII Some p-Block Elements
- Unit XIV Organic Chemistry – some basic principles
- Unit XV Hydrocarbons
- Unit XVI Purification and Characterisation of carbon compounds
- Unit XVII Organic Compounds with functional groups containing halogens (Haloalkanes and haloarenes)
- Unit XVIII Environmental Chemistry

**Practicals****CLASS XII****Semester III****Theory**

- Unit I Atomic Structure and Chemical bonding



- Unit II The Solid State
- Unit III Solutions
- Unit IV Thermodynamics
- Unit V Electrochemistry
- Unit VI Chemical Kinetics
- Unit VII Surface Chemistry
- Unit VIII p-Block Elements

### Practicals

### Semester IV

#### Theory

- Unit IX d-and f-block elements
- Unit X Coordination compounds and organometallics
- Unit XI Nuclear Chemistry
- Unit XII Stereochemistry
- Unit XII Organic Compounds with functional groups containing Oxygen-I (Alcohols, phenols and ethers)
- Unit XIV Organic Compounds with functional groups containing Oxygen-II (Aldehydes, ketones, carboxylic acids and their derivatives)
- Unit XV Organic Compounds with functional groups containing nitrogen (Nitro, amino, cyano and diazo compounds)
- Unit XVI Polymers
- Unit XVII Biomolecules
- Unit XVIII Chemistry in everyday life

### Practicals

## CLASS XI

#### Theory

### Semester 1 (Periods 90)

#### Unit I - Some Basic Concepts of Chemistry (Periods 8)

Importance of studying Chemistry, physical quantities and their SI units, dimensional analysis, Precision and significant figures, classification of matter, laws of chemical combination, Dalton's Atomic Theory, mole concept, atomic, molecular and molar masses, Percentage composition and molecular formula, stoichiometry of chemical reactions.

#### Unit II - States of Matter (Periods 9)

States of matter, Gaseous state - measurable properties, the gas laws, Ideal gas equation - kinetic molecular theory, deviation of real gases from ideal

behaviour; liquefaction of gases, critical temperature and its importance. Liquid state - properties of liquids, qualitative description of vapour pressure, surface tension, viscosity; Solid state - Classification of solids based on different binding forces.

#### Unit III - Atomic Structure (Periods 12)

Fundamental particles, Rutherford's model of an atom, nature of electromagnetic radiation, emission spectrum of hydrogen atom, concept of energy levels (orbits), weaknesses of Bohr's model, modern concept of structure of atom (elementary idea only), idea of shells, subshells and orbitals, the four quantum numbers, electronic configurations of elements, Aufbau principle (Pauli's exclusion principle and Hund's rule).

#### Unit IV - Classification of Elements and Periodicity in Properties (Periods 8)

The need for classification; the significance of (i) Mendeleev's periodic law, (ii) Atomic number and periodic law, present form of the periodic table, The IUPAC nomenclature for the elements with  $Z > 100$ , electronic configuration of the elements and periodic table, types of elements: s, p, d and f blocks, periodic trends in properties: ionization energy, electron affinity, atomic radii, valency.

#### Unit V - First Law of Thermodynamics and Chemical Energetics (Periods 12)

Some basic concepts - systems surroundings, types of system, types of processes, intensive and extensive properties, state functions, irreversible process. Zeroth Law, First Law of Thermodynamics - internal energy, enthalpy, work, heat capacity, specific heat capacity, molar heat capacity, enthalpy changes during phase transitions, Enthalpy change in chemical reactions - standard enthalpy of formation, Hess's law of constant heat summation, bond enthalpy, measurement of enthalpy of reactions, energy of combustion reactions, sources of energy - Sun as primary source of energy, Alternative sources of energy.

#### Unit VI - Chemical bonding and Molecular Structure (Periods 12)

Kossel - Lewis approach to bonding, ionic bond - lattice energy, Born - Haber Cycle, covalent bond - Lewis structure of covalent bond, resonance structures, geometry of molecules, VSEPR model, Polarity of bond, Electronegativity, Valence Bond



approach, concept of resonance, Directional properties of bond, hybridization (Qualitative treatment  $sp$ ,  $sp^2$ ,  $sp^3$ )

### Unit VII - Equilibrium-I - Equilibrium processes and phase equilibria (Periods 8)

Dynamic nature of equilibrium, Equilibrium in physical processes, Equilibrium in chemical processes, law of chemical equilibrium, derivation of relationship between  $K_p$  and  $K_c$ , Le-Chatelier's principle.

### Unit VIII - Equilibrium-II - Ionic Equilibrium in Solutions (Periods 12)

Equilibria involving ions, various concepts of acids and bases - Arrhenius, Bronsted Lowery and Lewis, dissociation of acids and bases, acid-base equilibria, ionization of water, pH scale, hydrolysis of salts, pH calculation of salt solutions, acid-base titration using indicator. Solubility Equilibria - solubility of sparingly soluble salts, solubility equilibrium and solubility product, common ion effect, elementary idea of buffer solutions.

### Unit IX - Redox Reactions (Periods 9)

Oxidation and Reduction - electron transfer concept, redox reactions in aqueous solution, oxidation number, balancing of chemical equations in redox reactions by oxidation number methods and ion-electron method or half equation method, simple idea of electrode potential, standard electrode potential, stoichiometry of redox reactions in solutions.

## Semester II (Periods 90)

### Unit X - Principles and Processes of Extraction of Elements (Periods 6)

Modes of occurrence, chemical principles underlying - concentration of ores, reduction/oxidation (electronation/de-electronation), refining of metals.

### Unit XI - Hydrogen (Periods 6)

Unique position in Periodic Table, occurrence, isotopes, dihydrogen - preparation (including commercial preparation), properties, reactions and uses. Hydrides - molecular, saline and interstitial. Water: structure and aggregation of water molecules (physical and chemical properties, hard and soft water, water softener. Heavy water, hydrogen peroxide, hydrogen economy, use of liquid hydrogen as a fuel.

### Unit XII - s-Block Elements (Periods 16)

*General introduction to s-block elements* - abundance, occurrences, anomalous properties of the first elements in each group, diagonal relationship.

**Alkali metals** - occurrence, electronic configuration, trend in atomic and physical properties (including IE, atomic and ionic radii), reactivity and electrode potential, reactions with oxygen, hydrogen, halogens and liquid ammonia. Basic nature of oxides and hydroxides, halides. Li and Na - occurrence, extraction, properties and uses,  $Na_2CO_3$ . **The Alkaline Earth Metals** - occurrence, electronic configuration, trends in atomic and physical properties (including IE, atomic and ionic radii), Reactivity and electrode potential, reactions with non-metals, oxides, hydroxides and halides. Solubility and thermal stability of their oxo salts. **Magnesium** - occurrence, extraction, properties and uses. Compounds of alkaline earth metals -  $CaO$ ,  $Ca(OH)_2$ , Plaster of Paris and  $MgSO_4$ , Industrial uses of lime and limestone, cement.

### Unit XIII - Some p-Block Elements (Periods 16)

**Boron** - occurrence, isolation, physical and chemical properties, borax, boric acid, boron hydrides, halides (elementary idea of boranes, diborane, borates). Uses of boron and its compounds.

**Carbon** - terrestrial abundance and distribution, allotropes (graphite, diamond, elementary idea of fullerenes). Atomic and physical properties, chemical properties, oxides, carbides, halides, sulphides, uses of carbon.

**Nitrogen** - terrestrial abundance and distribution, dinitrogen - isolation, atomic and physical properties, chemical reactivity, fixation of nitrogen - industrial and biological.

**Ammonia** - industrial preparation, Haber's process only, important properties and reactions.

**Oxides of nitrogen** - preparation, structure (skel-etal only)  $p_p-p_p$  bonding. Nitric acid, industrial production (Ostwald process). Uses of nitrogen, and its compounds.

**Oxygen** - terrestrial abundance and distribution; dioxygen, isolation, atomic and physical properties, chemical reactivity, oxides, acidic, basic and amphoteric.

**Ozone** - preparation, structure and some oxidizing properties.



## Unit XIV - Organic Chemistry - Some Basic Principles (Periods 10)

Tetravalency of carbon, hybridization. (p and s) bonds, shapes of simple molecules, functional groups:  $-C \equiv C-$ ,  $-C^{\circ}C-$  and functional groups containing halogen, oxygen, nitrogen and sulphur, homologous series, isomerism (structural).

General introduction to naming organic compounds - trivial names and IUPAC nomenclature. Illustration with simple examples.

Electronic displacement in a covalent bond; inductive effect, electrometric effect, resonance and hyperconjugation. Fission of a covalent bond; free radicals, electrophiles, nucleophiles, carbocations and carbanions.

Common types of organic reactions: substitution, addition, elimination and rearrangement reactions. Illustrations with examples.

## Unit XV- Hydrocarbons (Periods 13)

Classification of hydrocarbons, *alkanes and cycloalkanes*. Nomenclature, conformations of alkanes and cycloalkanes (ethane, propane, butane and cyclohexane), 3D structures and 2D projections (Sawhorse and Newmann).

*Alkenes and alkynes* - nomenclature, geometrical isomerism in alkenes, stability of alkenes, general methods of preparation, physical properties, chemical reactions - reactivity, mechanism of electrophilic addition, reactions in alkenes, Markownikoff's rule, peroxide effect, acidic character of alkynes, polymerization reactions - dienes, concept of delocalisation of electrons, addition reactions in dienes (1, 2 and 1,4 addition).

*Aromatic hydrocarbons* - Benzene and its homologues, isomerism, nomenclature, sources of aromatic hydrocarbons (coal and petroleum), structure of benzene, resonance, delocalisation, concept of aromaticity - an elementary idea. Chemical reactions of benzene - mechanism of electrophilic substitution reaction. Directive influence of substituents and their effect on reactivity, polynuclear hydrocarbons and their toxicity.

*Petroleum and petrochemicals*: Composition of crude oil, fractionation, uses of different fractions, quality of gasoline, LPG and CNG. Cracking and reforming, petro-chemicals.

## Unit XVII - Purification and Characterisation of Carbon Compounds (Periods 10)

Purification of carbon compounds, filtration, crystallisation, sublimation, distillation, differen-

tial extraction, chromatography.

Qualitative analysis, detection of nitrogen, sulphur, phosphorus and halogens.

Quantitative Analysis - estimation of carbon, hydrogen, nitrogen, halogen, sulphur and phosphorus (basic principles only).

Determination of molecular mass - silver salt method, chloroplatinate salt method, use of mass spectrometer for determining accurate molecular mass (elementary idea only). Calculations of empirical and molecular formulae.

## Unit XVII - Organic Compounds with functional groups Containing Halogens (Haloalkanes and Haloarenes) (periods 7)

Nature of C-X bond in haloalkanes and haloarenes, nomenclature, physical properties, chemical reactions with emphasis on mechanism of substitution reactions, difference in reactivity of C-X bond in haloalkanes and haloarenes.

Some commercially important compounds - names and structures of some compounds with simple structures and their uses.

## Unit XVIII - Environmental Chemistry (Periods 7)

Environmental pollutants; soil, water and air pollution; chemical reactions in atmosphere, kind of smog, major atmospheric pollutants; acid rain, Ozone and its reactions, effects of the depletion of ozone layer, Green house effect and global warming - industrial air pollution, green chemistry as an alternative tool for reducing pollution.

## Practicals

### Semester I

(Periods: 30)

### Basic Laboratory Techniques

(Periods 4)

- Cutting a glass tube and glass rod
- Bending of a glass tube
- Drawing out a glass jet
- Boring a cork

### Experiments

- Preparation of crystals from an impure sample of any one from the following: Alum, copper sulphate, ferrous sulphate. (Periods 2)
- Determination of solubility of a solid substance in water at different temperature and plotting of solubility curve. (Periods 2)
- (a) Determination of pH of some solutions



obtained from fruit juices and acids and bases of different dilutions using pH paper/universal indicator. (Periods 2)

(b) Study of pH change by common-ion effect in case of weak acids and weak bases.

4. Study of shift in equilibrium between ferric ions and thiocyanate ions by increasing/decreasing the concentration of either ions.

(Periods 2)

or

Study or the shift in equilibrium between  $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$  acid  $\text{Cl}^-$  by changing the concentration of either ions. (Periods 2)

5. Determination of: (a) enthalpy of calcium chloride; (b) enthalpy of neutralization of the reaction between strong acid ( $\text{HCl}$ ) and strong base ( $\text{NaOH}$ ).

(Periods 4)

or

Determination of enthalpy change during interaction (hydrogen bond formation) between acetone and chloroform.

6. (a) Setting of a chemical balance and preparation of a standard solution of oxalic acid.  
(b) Determination of strength of a given sodium hydroxide solution by titrating it against a standard solution of oxalic acid. (Periods 6)
7. (a) Preparation of standard solution of sodium carbonate.  
(b) Determination of strength of a given solution of dilute hydrochloric acid by titrating it against a standard solution of sodium carbonate. (Periods 6)

## Semester II

(Periods 30)

### Experiments

1. Determination of one cation and one anion from the following (insoluble salts to be excluded): (Periods 14)

Cations -  $\text{Pb}^{2+}$ ,  $\text{Cu}^{2+}$ ,  $\text{As}^{3+}$ ,  $\text{Al}^{3+}$ ,  $\text{Mn}^{2+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Co}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Sr}^{2+}$ ,  $\text{Ba}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{NH}_4^+$

Anions -  $\text{CO}_3^{2-}$ ,  $\text{S}^{2-}$ ,  $\text{SO}_4^{2-}$ ,  $\text{NO}_2^-$ ,  $\text{NO}_3^-$ ,

$\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{PO}_4^{3-}$ ,  $\text{CH}_3\text{COO}^-$ .

2. (i) Determination of melting point of a solid substance (preferably an organic substance of low melting point).

(Periods 2)

- (ii) Determination of boiling point of an

organic liquid (such as acetone and carbon tetrachloride (using water bath).

(Periods 2)

3. Detection of nitrogen, sulphur and halogens in an organic compound (detection of maximum two elements may be asked and combination of halogens may be avoided).

(6 Periods)

4. Preparation of acetylene and study of its acidic character. (Periods 2)

5. (i) To study the redox reaction of compounds containing sulphur in its different oxidation states: (such as  $\text{KI} + \text{H}_2\text{SO}_4$ ,  $\text{Na}_2\text{SO}_3 + \text{H}_2\text{S}$ ) (Periods 2)

- (ii) To study the role of acidic, basic and neutral medium in the oxidizing action of potassium permanganate. (Periods 2)

## CLASS XII

### Theory

### Semester III

(Periods 90)

### Unit I - Atomic Structure and Chemical Bonding

(Periods 12)

Dual nature of matter and radiation, de-Broglie relation, Uncertainty Principle, Wave-mechanical treatment of hydrogen atom (elementary), Wave functions and quantum numbers, Atomic orbitals and their shapes, Spin Quantum Number, Electronic configuration and atoms, Molecular-orbital method (homonuclear diatomic molecules only), Concept of bond order, Metallic bond, (simple qualitative treatment w.r.t. bond theory), Hybridisation involving s, p, and d-orbitals, Intermolecular forces

### Unit II - The Solid State

(Periods 8)

Space lattice, unit cells, cubic crystal system, Close packing in crystals, X-ray studies of crystals, Structure of simple ionic compounds ( $\text{AB}$  and  $\text{AB}_2$  type only), Imperfection in solids, Properties of solids, (electrical, magnetic and dielectric), Amorphous solids (elementary idea only).

### Unit III - Solutions

(Periods 10)

Units of concentration, solubility of gases, Solubility of solids, Vapour pressure of a solution, Colligative properties (Relative lowering of vapour pressure, elevation of boiling point, depression in freezing point and osmotic pressure), Determination of molecular mass, Abnormal molecular mass.



**Unit IV - Thermodynamics** (Periods 12)

First law (brief), Second Law of Thermodynamics, Entropy (criterion of spontaneous and non-spontaneous processes), Gibb's free energy (criterion for spontaneity of a process), Standard entropies and free energy of formation, Free energy change and Chemical Equilibrium, Free energy change and non-mechanical work, Third Law of Thermodynamics

**Unit V - Electrochemistry** (Periods 12)

Electrolytic and Galvanic cells, Electrolysis and laws of electrolysis, Electrolytic conduction - conductance, conductivity, molar conductivity, Kohlrausch's law and its applications, Galvanic Cells - electrode potential, electromotive force, Nernst's equations, electrode potential and electrolysis, Primary and secondary cells including fuel cells, Corrosion and its Prevention, Commercial production of chemicals - examples only, manufacture of NaOH, Na, Al,  $\text{Cl}_2$  and  $\text{F}_2$ .

**Unit VI - Chemical Kinetics** (Periods 11)

Average and instantaneous rate of a reaction, rate expression and order of a reaction, Integrated rate expressions of zero and first order reactions and their derivations, half life period, determination of rate constant/order of reaction (graphical method and Ostwald Isolation method only), Temperature dependence of rate constant - Arrhenius equation, activation energy, Mechanism of reaction - elementary and complex reactions, reactions involving 2-3 steps only.

**Unit VII - Surface Chemistry** (Periods 9)

Adsorption - physical and chemical adsorption, Factors affecting adsorption - effect of pressure (Freundlich and Langmuir Isotherm) and effect of temperature (qualitative only), Catalysis - enzymes, zeolites. Colloids - distinction between true solution, colloids and suspensions, classification based on dispersion medium and dispersed phase. Types of Colloids - Lyophilic and lyophobic, multimolecular, macromolecular and associated colloids (micelles), Methods of preparation of colloids and their properties, Emulsions - Types of emulsions oil/water and water/oil emulsifiers.

**Unit VIII - P-Block Elements** (Periods 16)

*Group 13 Elements:* Introduction, occurrence and uses, Atomic and physical properties, Oxidation state, trends in chemical reactivity. Aluminium: Extraction from bauxite, reaction of Al with acid and alkali.

*Group 14 Elements:* Introduction, occurrence and uses, Atomic and physical properties, Oxidation State, Trends in Chemical Reactivity, Forms of silica: uses and structure, Silicates (preliminary treatment), Silicones: Structure and uses, Tin and Lead: extraction, halides and oxides (Preparation, properties and uses).

*Group 15 Elements:* Introduction, occurrence and uses, Atomic and physical properties, oxidation states, trends in chemical reactivity, hydrides, oxides and halides, Phosphorus Production - allotropes. Phosphine: preparation, structure.  $\text{PCl}_3$ ,  $\text{PCl}_5$ ,  $\text{P}_4\text{O}_6$ ,  $\text{P}_4\text{O}_{10}$  and oxoacids of phosphorus (structure only).

*Group 16 Elements:* General introduction, occurrence and uses, Atomic and physical properties, oxidation states, trends in chemical reactivity of the elements. Some important compound: oxides - oxoacids, hydrides and halides (structure and properties), Sulphur - production, allotropes, oxides, sulphuric acid - manufacture and uses.

*Group 17 Elements:* General introduction, occurrence and uses, Atomic and physical properties, oxidation states, trends in chemical reactivity of the element and compounds. Hydrides, oxides and oxoacids of chlorine. Bleaching powder - preparation and properties, Interhalogen compounds (types, formulae and shapes ( $\text{AX}$ ,  $\text{AX}_3$ ,  $\text{AX}_5$ ,  $\text{AX}_7$ )).

*Group 18 Elements:* Introduction, Isolation and uses, Atomic and physical properties. Compounds of xenon - xenon fluorides, oxides and oxoacids (preparation, structure reaction with water).

**Semester IV****(Periods 90)****Unit IX - d and f-Block Elements** (Periods 10)

*d-block elements:* Electronic configuration and characteristics of the transition elements, General trends in the chemistry of first row transition elements (metallic character, IE, electrode potential, oxidation state, ionic radii, catalytic properties, coloured ions, complex formation, magnetic properties, interstitial compounds, alloy formation).

Occurrence and principles of extraction: Iron, copper, silver, zinc and mercury. Steel and some important alloys.

Compounds: preparation, properties of  $\text{CuSO}_4$ ,  $\text{AgNO}_3$ , silver and mercury halides,  $\text{K}_2\text{Cr}_2\text{O}_7$  and  $\text{KMnO}_4$ .

Photography (Chemistry of developing, fixing and printing)



*f-block elements*: Lanthanides - Introduction, oxidation state - Chemical reactivity, Lanthanide contraction, Uses.

*Actinides* - Introduction, Electronic configuration, brief comparison with lanthanides.

### **Unit X - Coordination Compounds and Organometallics** (Periods 8)

*Coordination Compounds* - introduction, ligands and coordination number

IUPAC formulation and nomenclature of mononuclear coordination compounds

Isomerism including stereoisomerisms.

Bonding - V.B. Approach, shapes, colour, magnetic properties, crystal field theory (qualitative idea only).

Idea of stability of coordination compounds (a brief idea of stability constant of coordination compounds).

Importance of coordination compounds in qualitative analysis, extraction of metals and biological systems (chlorophyll, vitamin B<sub>12</sub> and hemoglobin).

### **Unit XI - Nuclear Chemistry** (Periods 6)

Natural and artificial radioactivity, nuclear reactions, artificial transmutation of elements, Nuclear energy - nuclear fission and fusion, nuclear reactors. Radioactive isotopes and their uses, half-life period, radiochemical dating; Synthetic elements including transactinides (elementary idea only).

### **Unit XII - Stereochemistry** (Periods 7)

Introduction of isomerism and recapitulation of geometrical isomerism and conformations, optical activity - discovery, determination using a polarimeter, specific rotation, chirality - chiral objects, chiral molecules, configuration and Fischer projections, asymmetric carbon, elements of symmetry, compounds containing one chiral centre, enantiomers. D-L and R-S nomenclature, racemic forms, racemisation. Compounds containing two chiral centers, diastereoisomers, mesoform, resolution, importance of stereochemistry.

### **Unit XIII - Organic Compounds with Functional Groups Containing Oxygen-I**

(Periods 7)

(Alcohols, Phenols and Ethers)

#### *Alcohols and Phenols*

Electronic structure of functional groups, nomenclature, important methods of preparation, physical properties, chemical reactions - mechanism

of dehydration of alcohols, acidity of phenols, reactivity of phenols in electrophilic substitution.

#### *Ethers*

Electronic structure of functional group, nomenclature, important methods of preparation, physical and chemical properties.

Some commercially important compounds.

### **Unit XIV - Organic Compounds with Functional Groups Containing Oxygen-II**

(Periods 11)

(Aldehydes, Ketones, Carboxylic acids and their derivatives)

#### *Aldehydes and Ketones*

Electronic structure of carbonyl group, nomenclature, important methods of preparation, physical properties, chemical reactions - reactivity of aldehydic and ketonic groups, acidity of  $\alpha$ -hydrogen, aldol condensation, cross aldol condensation, cannizzarro reaction. Mechanism of nucleophilic addition reaction to  $C=O$  group.

#### *Carboxylic Acids*

Electronic structure of  $-COOH$ , nomenclature, important methods of preparation, Physical properties and effect of substituents on  $\alpha$ -carbon on acid strength, Chemical reactions - mechanism of esterification.

#### *Derivatives of Carboxylic Acids*

Electronic structure of acid chloride, acid anhydride, ester and amide groups, nomenclature, important methods of preparation, comparative reactivity of acid derivatives.

Some commercially important compounds.

### **Unit XV- Organic Compounds with Functional Groups Containing Nitrogen**

(Periods 9)

(Nitro, Amino, Cyano and Diazo Compounds)

#### *Nitro Compounds*

Electronic Structure of  $NO_2$  group, nomenclature, important method of preparation, physical properties, Chemical reactions.

#### *Amines*

Structure of amino groups (Primary, Secondary and Tertiary), nomenclature, important methods of preparation, physical properties - basic character of amines, Chemical reactions - separation



of primary, secondary and tertiary amines.

**Cyanides and Isocyanides:** Structures of cyanide and isocyanide groups, nomenclature, preparation, physical properties and chemical reactions.

### Diazonium Salts

Preparation and chemical reactions of benzene diazonium chloride, importance of diazonium salts in synthetic organic chemistry.

Some commercially important compounds.

## Unit XVI - Polymers (Periods 7)

Classification of polymers, General methods of polymerization – Addition and condensation: addition – free radical, cationic and anionic polymerization. Copolymerisation, natural rubber, vulcanization of rubber, synthetic rubbers.

Condensation polymers, Molecular mass of polymers (highlighting level of complexity only). Biopolymers and biodegradable polymers.

Some commercially important Polymers.

## Unit XVII - Biomolecules (Periods 13)

The cell, energy cycle

**Carbohydrates:** Classification, monosaccharides, Structures of pentoses and hexoses, anomeric carbon, mutarotation, simple chemical reactions of glucose. Disaccharides: reducing and non-reducing sugars – sucrose, maltose and lactose. Polysaccharides: Elementary idea of structures of starch and cellulose.

**Proteins:**  $\alpha$ -amino acids: peptide bond, polypeptides, primary structure of proteins. Simple idea of secondary and tertiary structures of proteins, Denaturation of proteins, and enzymes.

**Nucleic Acids:** Types of nucleic acids, primary building blocks of nucleic acids (chemical composition – DNA and RNA), primary structure of DNA and its double helix. Replication, transcription and Protein synthesis, Genetic Code.

**Lipids:** Classification, structure, functions in biosystems.

**Hormones:** Classification, structural features and functions in biosystems.

**Vitamins:** Classification, functions of vitamins in biosystems

## Unit XVIII - Chemistry in Everyday Life

(Periods 12)

**Chemicals in medicine and health-care** – Analgesics, Tranquillisers, antiseptics, disinfectants, antimicrobials, anti-fertility drugs, antihistamines, antibiotics, antacids.

**Dyes** – classification with examples - Indigo, methyl orange, aniline yellow, alizarin, malachite green.

**Chemicals in cosmetics** (creams, perfumes, talcum powder, deodorants),

**Advanced materials** – carbon fibres, ceramics, micro alloys.

**Chemicals in food** – preservatives, artificial sweetening agents, antioxidants, and edible colours.

**Detergents** – classification, some important examples

**Insect repellents** – Pheromones, sex attractants

**Rocket Propellants** – characteristics, chemicals used.

## Practicals

### Semester III

(Periods 30)

#### Experiments

- (i) Preparation of double salt of ferrous ammonium sulphate or potash alum.

or

- (ii) Preparation of potassium ferric oxalate. (Periods 2)

- (i) Preparation of one lyophilic and one lyophobic sol.

(Periods 4)

Lyophilic sols – starch, egg albumin and gum

Lyophobic sols – aluminium hydroxide, ferric hydroxide, arsenious sulphide.

- (ii) Dialysis of sols prepared in 2 (i) above.

- Study of the role of emulsifying agents in stabilizing the emulsions of different oils.

(Periods 2)

- Effect of concentration and temperature on the rate of reaction between sodium thiosulphate and hydrochloric acid. (Periods 2)

- Study of reaction rates of any one of the following: (Periods 4)

- (i) Reaction of iodide ions with hydrogen peroxide at room temperature using different concentrations of iodide ions.

- (ii) Reaction between potassium iodate,  $\text{KIO}_3$  and sodium sulphite: ( $\text{Na}_2\text{SO}_3$ ) using starch solutions as indicator (clock reaction).

- (i) Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of  $R_f$  values.



- (ii) Separation of constituents present in an inorganic mixture containing two cations only (constituents having wide difference in  $R_f$  values to be provided). (Periods 4)
7. Determination of concentration/molarity of  $\text{KMnO}_4$  solution by titrating it against a standard solution of: (Periods 8)
- Oxalic acid
  - Ferrous ammonium sulphate
- (Students will be required to prepare standard solutions by weighing themselves)
8. Analysis of  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  present in drinking water quantitatively by EDTA. (Periods 4)

**Semester IV****(Periods 30)****Experiments**

- Qualitative analysis (Periods 12)  
Determination of two cations and two anions in a given mixture  
Cations -  $\text{Pb}^{2+}$ ,  $\text{Cu}^{2+}$ ,  $\text{As}^{3+}$ ,  $\text{Al}^{3+}$ ,  $\text{Fe}^{3+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Co}^{2+}$ ,  $\text{Mn}^{2+}$ ,  $\text{Ni}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Ba}^{2+}$ ,  $\text{Sr}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{NH}_4^+$   
Anions -  $\text{S}^{2-}$ ,  $\text{SO}_3^{2-}$ ,  $\text{SO}_4^{2-}$ ,  $\text{CO}_3^{2-}$ ,  $\text{NO}_2^-$ ,  $\text{NO}_3^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{PO}_4^{3-}$ ,  $\text{CH}_3\text{COO}^-$   
**(Note:** Insoluble and interfering ions are be excluded)  
Also, two cations of the same group and anions combinations such as  $(\text{SO}_4^{2-} + \text{SO}_3^{2-})$ ,  $(\text{NO}_2^- + \text{NO}_3^-)$  or,  $(\text{Cl}^- + \text{Br}^-)$ , or  $(\text{Br}^- + \text{I}^-)$ ,  $(\text{CO}_3^{2-} + \text{C}_2\text{O}_4^{2-})$  should be avoided.
- Study of carbohydrates, fats and proteins in pure form and detection of their presence in given foodstuffs. (Periods 2)
- Test for the functional groups present in organic compounds: (Periods 4)  
Unsaturation, alcoholic, phenolic, aldehydic, ketonic, carboxylic and amino (primary) groups.
- Preparation of any one of the following compounds: (Periods 2)  
(i) Iodoform (ii) Acetanilide (iii) Di-benzal acetone (iv) p-Nitroacetanilide (v) Aniline yellow or b - Naphthol aniline dye.
- Variation of cell potential in  $\text{Zn}|\text{Zn}^{2+}||\text{Cu}^{2+}|\text{Cu}$  with change in concentration of electrolytes ( $\text{CuSO}_4$  or  $\text{ZnSO}_4$ ) at room temperature. (Periods 2)

**Investigatory Projects**

Report on an investigatory project conducted by a student is to be submitted at the time of final examination.

**A Few Suggested Projects****(Periods 8)**

- Study of diffusion of a solid into a liquid.
- Determination of the minimum quantity of manganese dioxide required as a catalyst for the preparation of oxygen gas.
- Determination of rate of flow of solutions and liquids horizontally.
- Investigation of the foaming capacity of different washing soaps and the effect of addition of sodium carbonate on them.
- Study of the acidity of different samples of the tea leaves and reasons for the variation in their taste.
- Determination of the rate of evaporation of different liquids.
- Study of effect of metal coupling on the corrosion of iron.
- Study of the effect of acids and bases on the tensile strength of fibres.
- Analysis of fruit and vegetable juices for the contents (acids and minerals) present in them.
- Preparation of rayon threads from various cellulose sources.
- Study of dyeing fabrics under various conditions.
- Determination of the dosage of bleaching powder required for disinfections of different samples of water (taken from different sources).
- Study of presence of oxalate ions in guava fruit at different stages of ripening.
- Study of the setting of mixtures of cement with lime, sand of different qualities, rice husk, etc. (with respect to time, volume and strength).
- Study of the presence of insecticide/pesticide (nitrogen containing) in vegetables and fruits.
- Study of the dialysis of different sewage water samples and identification of different ions in resulting solutions.
- Study of quantity of casein present in different samples of milk.
- Preparation of soyabean milk and its comparison with the natural milk with respect to curd formation, effect of temperature, taste, etc.



- Study of the effect of potassium bisulphate as food preservative under various conditions (temperature, concentration, time, etc.)
  - Study of digestion of starch by salivary amylase and effect of pH and temperature on it.
  - Comparative study of the rate of fermentation of following materials: wheat flour, gram flour, potato juice, carrot juice and organic juice.
  - Extraction of essential oils present in *Saunf* (aniseed), *Ajwain* (carum), *Illachi* (cardamom).
  - Study of constituents of an alloy (any sample easily available may be taken).
  - Study of common food adulterants in fat, oil, butter, sugar turmeric powder chilli powder and pepper.
- Note:** Any other investigatory project can be performed which involves about 8 periods of work with the approval of the teacher.

BIOLOGY







# Biology

Biology is offered as an elective subject at the Higher Secondary stage. The students take it with a view to pursuing career in life sciences, applied sciences, including medicine, and other allied courses. The present effort at revision and updating of the curriculum is an attempt to build on the feedback from user groups, to incorporate knowledge and educational and curricular changes.

Recent scientific developments have enlarged the scope of Biology. The genomics particularly the study of human genome, bio-technology and its applications in diagnosis and treatment of diseases and also the improvement of crops and animals would influence our lives to a great extent. The genetically modified organisms and nanotechnology, new technologies for environmental friendly development are of prime concern for both the individual and the environment.

The teaching at the Higher Secondary Stage should enable students to comprehend the concepts and gain knowledge. The experimental skills acquired and the gained knowledge prepare the students to live more meaningfully and contribute to the betterment of both quality of life and of environment. They would also appreciate the role of biology and its linkages with National Development.

## Features

The syllabus has been framed to cover essential functional dynamics of living world. Both theoretical and practical examples have been taken to show the origin and evolution of life, diversity of life, life forms, life processes, mechanism of growth, development, and inheritance of characters. Reproduction remain central to all aspects dealt in the syllabus. Environment related issues and problems such as pollution, degradation of land, water, and natural resources, wise use of natural resources and population have been included to help the students to study nature and life in

its protection through individual, group and institutional efforts.

There is emphasis on basic aspects of Biology. The recent developments in areas like genomics, recombinant DNA technology and other biotechnological aspects have been appropriately included in the syllabus.

The issues related to health, agriculture, environment and sustainable development have been covered to highlight the role of Biology in improving quality of life. The topics on tools and techniques would provide information on use of techniques in Biology and diagnosis of disorders. It will attract the interest of techniques like immunisation with social implications.

Some practicals on testing of food items, blood and urine along with other experiments would provide basic training to the students.

The syllabus is designed to cover rapid pace work include the following topics available to biology students.

Essential experiments would be included to highlight role of biology in developing modern concepts and applications prevailing in the society.

The syllabus is structured in Units spread over 4 semesters in two years duration. Each Unit will be further developed into chapters. The units are re-structured as per the various different directions of Biology as a subject. The time in terms of periods has been specified for each unit to help the writers of the instructional materials. The broad arrangement is such that has logic and clarity.

The practical syllabus has two components. There are some experiments to be undertaken by the students in the classroom and will be part of the practical examination.

Each student will also carry out one investigative project and submit the report for the external evaluation.

## Objectives

The Biology curriculum at Higher Secondary Stage should

- provide understanding of basic principles of Biology







# Biology

## Rationale

Biology is being offered as an elective subject at the higher secondary stage. The students take up Biology with a view to pursuing careers in fundamental and applied sciences, including medical and paramedical courses. The present effort of reforming and updating of the curriculum is an exercise based on the feedback from user groups, growth of knowledge and educational and curricular concerns.

The recent scientific developments have enlarged the scope of Biology. The genomics particularly the study of human genome, bio-technology and their applications in diagnosis and treatment of diseases, and also the improvement of crops and animal breeds would influence our lives to a great extent. The genetically modified organisms and their products, new technologies for abatement of pollution and environment friendly development are the immediate concerns for both quality of life and also of environment.

Biology teaching at the Higher Secondary Stage enables the students to comprehend the contemporary knowledge. The experimental skills attained and the gained knowledge prepare the learners to live more meaningfully and contribute to improvement of both quality of life and of environment. They would also appreciate the role of Biology and its linkages with National Development.

## Salient Features

Biology syllabus has been framed to cover structural and functional dynamics of living world. Both plant and animal examples have been taken to explain origin and evolution of life, diversity of living organisms, life processes, mechanism of growth and development, and inheritance of characters. Humans remain central to all aspects dealt in the syllabus. Environment related issues and problems such as pollution, degradation of land, over use of natural resources, wise use of natural resources and population have been included to prepare the students to study nature and help in

its protection through individual, group and institutional efforts.

There is emphasis on basic aspects of Biology. The recent developments in areas like genomics, recombinant DNA technology and other biotechnological aspects have been appropriately included in the syllabus.

The issues related to health, agriculture, environment and sustainable development have been covered to highlight the role of Biology in improving quality of life. The topic on tools and techniques would provide information on use of techniques in study of Biology and diagnosis of disorders. It will improve the misuse of techniques like amniocentesis with social implications.

Some practicals on testing of food items, blood and urine along with other experiments would provide basic training to the students.

Scope of biology in career options would include new opportunities available to biology students.

Suitable examples would be included to highlight role of biology in dispelling myths, misconceptions and misbeliefs prevailing in the society.

The syllabus is arranged in Units spread over 4 semesters in two years duration. Each unit will be further developed into chapters. The units are so sequenced so as to provide different dimensions of Biology as a subject. The time in terms of periods has been mentioned for each unit to help the writers of the instructional materials. The broad arrangement in each unit has topic and content.

The practical syllabus has two components. There are core experiments to be undertaken by the students in the classroom and will be part of the practical examination.

Each student will also carry out one investigatory project and submit the report for the examination.

## Objectives

The Biology curriculum at Higher Secondary Stage would—

- promote understanding of basic principles of Biology;



- expose the learners to emerging knowledge and its relevance to individuals, society;
- acquaint the students with benefits of knowing about issues related to nutrition, health, population, environment and development;
- encourage rationale/specific attitude to issues related to population, environment and development;
- develop skills essential to study and understand complexities of living world and harmonious co-existence;
- enhance awareness about environmental issues, problems and the appropriate solutions,
- develop appropriate environmental ethics, values;
- enable students to appreciate the complexity of living world and the role of Biology vis-à-vis other disciplines; and
- enable the students to appreciate role of Biology in dispelling myths, misconceptions and misbeliefs.

### Course Structure

#### CLASS XI

##### Semester I

##### Theory

Unit I Living World

Unit II Diversity of Life

Unit III Cell and Cell Division

##### Practicals

##### Semester II

##### Theory

Unit IV Genetics

Unit V Morphology of Plants and Animals

##### Practicals

#### CLASS XII

##### Semester III

##### Theory

Unit VI Physiology of Plants

Unit VII Physiology of Animals

Unit VIII Reproduction, Development and Growth

##### Practicals

##### Semester IV

##### Theory

Unit IX Ecology and Environment

Unit X Biology in Human Welfare

##### Practicals

## CLASS XI

### Theory

#### Semester I

##### Unit I – Living World

(Periods 15)

Biology and its branches; relationships with other sciences; scientific methods in Biology; historical breakthroughs; scope of Biology and career options; role of Biology in dispelling myths and misbeliefs; characters of living organisms, (elementary idea of metabolism, transfer of energy at molecular level, open and closed system, homeostasis, growth and reproduction, adaptation, survival, death).

Origin of Life – Oparin-Haldane theory, Miller Experiment; theories of evolution; evidences of evolution; sources of variations (mutation, recombination, genetic drift, migration, natural selection); concept of species; speciation and isolation (geographical and reproductive); origin of species.

##### Unit II – Diversity of Life

(Periods 45)

Variety of living organisms; Systematics; need, history and types of classifications (artificial, natural, phylogenetic); biosystematics; binomial nomenclature; Two kingdom system, Five kingdom system their merits and demerits; status of bacteria and virus; botanical gardens and herbaria; zoological parks and museums.

Salient features of various plant groups; classification of angiosperms upto series level (Bentham and Hooker's System).

Salient features of non-chordates up to phylum level and chordates up to class level.

##### Unit III – Cell and Cell Division (30 Periods)

Cell as a basic unit of life – discovery of cell, cell theory, cell as a self-contained unit; prokaryotic and eukaryotic cell; unicellular and multicellular organisms; tools and techniques (compound microscope, electron microscope and cell fractionation); Ultrastructure of prokaryotic and eukaryotic cell - cell wall, cell membrane – unit membrane concept (fluid mosaic model); membrane transport; cellular movement (exocytosis, endocytosis); cell organelles and their functions – nucleus, mitochondria, plastids, endoplasmic reticulum, Golgi complex, Lysosomes, microtubules, centriole, vacuole, cytoskeleton, cilia and flagella, ribosomes.



Molecules of cell: inorganic and organic materials – Water, salt, mineral ions, carbohydrates, lipids, amino acids, proteins, nucleotides, nucleic acids (DNA and RNA); Enzymes (properties, chemical nature and mechanism of action); vitamins, hormones and steroids.

Cell cycle; significance of cell division; amitosis, mitosis and meiosis; karyotype analysis.

## Semester II

### Unit IV – Genetics (45 Periods)

Continuity of life - heredity, variation; Mendel's laws of inheritance; chromosomal basis of inheritance; other patterns of inheritance - incomplete dominance, epistasis, multiple allelism, quantitative inheritance, pleiotropy.

Chromosomes – bacterial cell and eukaryotic cell; parallelism between genes and chromosomes; genome, linkage and crossing over; gene mapping; recombination; sex chromosomes; sex determination; sex linked inheritance; mutation and chromosomal aberrations; Human genetics – methods of study, genetic disorders.

DNA as a genetic material – its structure and replication; structure of RNA and its role in protein synthesis; Gene expression – transcription and translation in prokaryotes and eukaryotes; regulation of gene expression, induction and repression – housekeeping genes; nuclear basis of differentiation and development; oncogenes.

Basics of Recombinant DNA technology; cloning; gene bank; DNA fingerprinting; genomics – principles and applications, transgenic plants, animals and microbes.

### Unit V – Morphology of Plants and Animals (45 Periods)

Morphology - root, stem and leaf, their structure and modifications; Inflorescence, flower, fruit, seed and their types; Description of Poaceae, Liliaceae, Fabaceae, (Papilionaceae), Solanaceae, Brassicaceae and Asteraceae.

Internal structure of plants – Tissues (meristematic and permanent); tissue systems; anatomy of root, stem and leaf of monocot and dicot; secondary growth.

Morphology of Animals – Salient features of earthworm, cockroach, frog and rat; tissue systems, structure and function of tissues - epithelial, connective, muscular and nervous.

## Practicals

### Semester I

#### Core Experiments

(Periods 30)

1. Study of parts of compound microscope.
2. Study of mitosis in onion root tip and animal cell (grasshopper).
3. Study of meiosis in onion buds, and testis of grasshopper.
4. Study of cyclosis in leaf cell of *Hydrilla*, or *Tradescantia* and in *Paramoecium*.
5. Study of cell wall components (cellulose, lignin, suberin and mucilage).
6. Study of Mitochondria by staining with Janus Green.
7. Test for Sugar, Starch, Proteins and fats.
8. Study of the specimens and their identification with reasons – Bacteria, *Oscillatoria*, *Spirogyra*, *Rhizopus*, mushroom/bracket fungi, yeast, liverwort, moss, fern, pinus, one monocotyledon and one dicotyledon and lichens.
9. Study of characters of specimens and identification with reasons – *Amoeba*, *Hydra*, Liver fluke, *Ascaris*, Leech, Earthworm, Prawn, Silk worm, Honeybee, Snail, Star fish, Shark, Rohu, Frog, Lizard, Pigeon and Rabbit.

### Semester II

(Periods 30)

#### Core Experiments

1. Study of analysis of seed samples for Mendelian ratios.
2. Study of different modifications in root, stem, and leaf.
3. Study and identification of different types of inflorescence.
4. Study and description of the flowers – sunflower, pea, mustard, petunia, onion, wheat, peppy.
5. Study of parenchyma, collenchyma, sclerenchyma, xylem and phloem from prepared slides.
6. Preparation and study of transverse sections of dicot and monocot root and stems.
7. Study of squamous epithelium, muscle fibres, nerve cells and mammalian blood film through temporary/permanent slides.
8. Study of external morphology of earthworm, cockroach, frog and rat through models.



**CLASS XII****Theory****Semester III****Unit VI – Physiology of Plants** (periods 30)

Cell as a physiological unit; composition of protoplasm; water relations – absorption and movement (diffusion, osmosis, plasmolysis, permeability, water potential, imbibition); theories of water translocation – root pressure, transpiration pull; transpiration – significance, factors affecting rate of transpiration; mechanism of stomatal opening and closing, (Potassium ion theory); factors affecting stomatal movement.

Mineral nutrition – functions of minerals, essential major elements and trace elements; deficiency symptoms of elements; theories of translocation; translocation of solutes, nitrogen and nitrogen metabolism with emphasis on biological nitrogen fixation.

Photosynthesis – significance, site of photosynthesis (functional aspect of chlorophyll structure); photochemical and biosynthetic phases; electron transport system; photophosphorylation (cyclic and non-cyclic);  $C_3$  and  $C_4$  Pathway; photorespiration; factors affecting photosynthesis; mode of nutrition (autotrophic, heterotrophic – saprophytic, parasitic and insectivorous plants), chemosynthesis.

Mechanism of respiration – glycolysis, Krebs cycle, pentose pathway, anaerobic respiration; respiratory quotient; compensation point; fermentation.

**Unit VII – Physiology of Animals** (Periods 40)

Nutrition and its types; nutrients – food and vitamins; digestive system of invertebrate (cockroach); digestive system and process in humans (digestion – ingestion, absorption, assimilation, egestion); (intracellular and extracellular); role of enzymes and hormones in digestion; malnutrition and undernutrition; disorders related to nutrition.

Gaseous exchange in animals (earthworm/cockroach); respiration in humans – respiratory organs, mechanism; breathing and its regulation; transport of gases through blood; common respiratory disorders – prevention and cure.

Circulation of body fluids – open system in cockroach; closed system in humans, blood and its composition, structure and pumping action of human heart; pulmonary and systemic circulation; heart beat and pulse; rhythmicity of heart-

beat, blood related disorders – hypertension, atheroma and arteriosclerosis; ECG; pacemaker; lymphatic system, immunity and immune system.

Nitrogenous waste elimination – ammonotelism, ureotelism, uricotelism; excretory system of cockroach and humans; composition and formation of urine; role of kidney in osmoregulation; kidney failure; dialysis; kidney transplantation; role of ADH; role of skin and lungs.

Locomotion and movements; human skeleton – axial and appendicular including cranium and cage bones; Joints and their types; bone, cartilage and their disorders (arthritis, osteoporosis); mechanism of muscle contraction; red and white muscles in movements..

Nervous coordination in cockroach and humans; human nervous system – structure and functions of brain and spinal cord, transmission of nerve impulse; reflex action; sensory receptors; structure and function of sense organs – eye, ear, nose and tongue.

Human endocrine system; hormones and their functions; hormonal imbalance and diseases; role of hormones as messengers and regulators; hypothalamo – hypophyseal axis; feedback controls.

**Unit VIII – Reproduction, Growth and Development** (Periods 20)

Modes of reproduction in flowering plants – vegetative propagation (natural and artificial), significance of vegetative propagation; micropropagation; sexual reproduction – development of male and female gametophytes; pollination (types and factors); double fertilisation, incompatibility, embryo development, parthenogenesis and parthenocarpy.

Characteristics of Plant growth; growth regulators (phytohormones) – Auxins, gibberellins, cytokinins, ethylene, ABA; Seed germination – mechanism and factors affecting germination, role of growth regulators in seed dormancy; senescence; abscission; stress factors (salt and water) and growth; plant movement – geotropism, phototropism, turgor growth movements (tropics, nastic and nutation), process of flowering – photoperiodism, vernalisation.

Types of reproduction – a general account (asexual and sexual); human male and female reproductive systems; Reproductive cycle in human female gametogenesis; Fertilization – physical and chemical events; development of zygote upto 3 germinal layers and their derivatives; extra



embryonic membranes; general aspects of placenta.

Cellular growth – growth rate and growth curve; hormonal control of growth; mechanism and types of regeneration; ageing – cellular and extracellular changes; theories of ageing.

#### Semester IV

#### Unit IX - Ecology and Environment

(Periods 40)

Organisms and their environment; factors – air, water, soil, biota, temperature and light; range of tolerance; ecological adaptations.

Levels of organisation – population, species, community, ecosystem and biosphere; Ecological interactions – symbiosis, mutualism, commensalism, parasitism, predation and competition.

Ecosystem – structure and functions; productivity; energy flow; ecological efficiencies; decomposition and nutrient cycling; major biomes – forests, grasslands and deserts.

Ecological Succession – types and mechanism.

Natural resources – types, use and misuse of natural resources.

Environmental pollution – kinds, sources and abatement of air, water, soil and noise pollution.

Global environmental changes; Greenhouse gases, global warming, sea level rise and ozone layer depletion.

Biotic resources – terrestrial and aquatic including marine resources; bio-diversity – benefits and assessment; threats, endangered species, extinctions; conservation of bio-diversity (biosphere reserves and other protected areas); National and International efforts – both governmental and non-governmental; environmental ethics and legislation.

#### Unit X - Biology in Human Welfare

(Periods 50)

Population, environment and development; Population growth and factors – (vitality, mortality, immigration, emigration, age and sex ratio); impact of population growth; reproductive health; common problems of adolescence – social and moral implications; mental and addictive disorders; population as a resource.

Food production, breeding, improved varieties, biofertilizers, plant tissue culture and its applications; crop and animal diseases; biopesticides; genetically modified food; bio-war, biopiracy;

biopatent; biotechnology and sustainable agriculture.

Recent advances in vaccines; organ transplantation; immune disorders; modern techniques in disease diagnosis; AIDS, STD, cancer (types, causes, diagnosis, treatment); biotechnology in therapeutics – hormones, interferon and immuno modulations.

#### Practicals

#### Semester III

(Periods 30)

#### Core Experiments

1. Study of osmosis by potato- osmometer.
2. Study of plasmolysis in peels in isotonic, hypotonic and hypertonic solutions using sodium chloride and potassium chloride.
3. Study of imbibition by raisins.
4. Study of distribution of stomata on upper and lower surfaces of leaves.
5. Comparative study of rate of transpiration from upper and lower surfaces of leaves.
6. Study of effect of calcium, sodium and potassium ions on opening and closing of stomata.
7. Study of effect of heat, temperature, chemicals on plant root and other tissues by leaching of pigments.
8. Study of root nodules by cross-section.
9. To study the presence of carbohydrates, starch, fat and proteins in rice/wheat/gram/potato.
10. Study of plant pigments by paper chromatography.
11. Study of effect of light intensity, light quality, carbondioxide concentration and dissolved carbon dioxide on photosynthesis with Wilmount Bubbler.
12. Study of respiration in flower buds/leaf tissues and germinating seeds.
13. Study of rate of respiration in different substrates.
14. Study of growth of pollen tubes.
15. Observation and comments on the experimental set up on
  - (i) seed germination
  - (ii) breaking of seed dormancy
  - (iii) effect of cytokinins on senescence
  - (iv) photoplastics seed germination on lettuce.



16. Study of effect of salivary amylase on starch.
17. Study of effect of pH, temperature and alcohol on salivary amylase.
18. Analysis of nutrients in different types of food (child food, milk, lactogen).
19. To count various types of blood cells in a microscopic field.
20. To test the presence of urea in urine.
21. To detect the presence of sugar in urine.
22. To test the presence of albumin in urine.
23. To test the presence of bile salts in urine.
24. Study of blood sugar in the blood sample.
8. Study of pollen structure and calculation of pollen viability.
9. Study of rates of pollen germination of various species in sugar and boron solution.
10. Study of effect of 2-4-D on translocation process.
11. Study of effect of gibberellins on seed germination and shoot elongation.
12. Effect of herbicide on lawn weeds (to compare the effect on monocotyledons and dicotyledons).
13. Study of dispersal of seeds by various agencies.

**Semester IV**

(Periods 30)

*Core Experiments*

1. Study of plant population (density and frequency) by quadrat method.
2. Study of pollutants in water.
3. Study of pollutants in air.
4. Study of physical properties of different soils.
5. Study of chemical properties including pH of different soils.
6. Study of moisture in given samples of soil.

*Investigatory Projects (Suggested)*

1. Study of effect of fertilizers on the rate of germination, elongation of hypocotyls, and the length of root.
2. Study of competition between weeds and crop.
3. Study of effect of antibiotics on microorganisms.
4. Study of apical dominance in potato and coleus.
5. Study of breaking of dormancy of seeds by  $\text{KNO}_3$ , ethylene, cytokinin.
6. Study of deficiency symptoms of various essential elements and minerals.
7. Study of effect of light and gravity on plant growth movement.
14. Study of canopy architecture of trees.
15. To study the effect of avenue trees on temperature under canopy and outside.
16. Study of pollination in sunflower and legume.
17. Comparative study of the chlorophyll content in five different species of plants.
18. Study of adaptability of cockroaches to drastic environmental changes.
19. Study of frog/toad's ovary during breeding season to identify the stages of maturation of the ova.
20. Study of metamorphosis of toad/frog's tadpole through preserved specimen.
21. Study of various stages of development of housefly/cockroach.
22. Study of development of drug resistance in bacteria using antibiotics.
23. Study of coaguable and non-coaguable milk proteins.
24. Study of effect of osmotic stress by hypertonic saline in frog.
25. Study of locomotion and role of different fins in fishes.
26. Study of zooplanktons from fresh water ponds and tanks.



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...ing mathematics...  
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# MATICS







# Mathematics

## Rationale

Mathematics has been an inseparable part of school curriculum ever since the beginning of formal education and it continues to be so. However, the mathematics curriculum has to undergo changes from time to time in accordance with the growth of the subject and the changing needs of the society.

It is common knowledge that different branches of science including mathematics are developing with astonishing rapidity and exciting discoveries of far reaching importance occurring in quick succession. Today new concepts have surfaced and developmental work has been done in mathematics and the fact that with these developments and researches, mathematics has found a greater role to play in the latest technology such as computer software and hardware development. There arises a need of more critical and penetrative thinking to educate the youth of its importance and how can it help to build their career more meaningful and beneficial.

The higher secondary stage is a launching stage from where the students would go either for higher academic education in mathematics through colleges and universities or for professional courses like engineering, medical education or computer application. In view of the need for a sound training in either of the streams, it is utmost important to make mathematics education at this level broad-based and meaningful.

The present effort of reforming and updating the mathematics curriculum is an exercise based on the feedback studies, undertaken by the Department of Education in Science and Mathematics in 2000. A large number of mathematicians, mathematics educators and teachers of mathematics were involved in these studies. The consensus evolved out of these studies at higher secondary stage was that mathematics would be taught as a discipline to the extent possible.

The National Curriculum Framework, 2000 has recommended the semester pattern of education at higher secondary stage. The greatest argument

in support of the semester system is the freedom it offers in experimenting with the satisfactory tools and techniques of evaluation in general and the learning outcomes in particular.

Till 1998, students of all streams viz., science, commerce and arts have to study the same topics although the needs of students of different streams are different. This anomaly has been rectified by introducing new syllabi in mathematics. The revised syllabi cater to the needs of all students of different streams.

## Salient Features

- Syllabus for higher secondary stage has been prepared semester wise comprising of four semesters. Each semester is of 120 periods.
- In order to meet the challenges of information, and technology, a new topic-Boolean Algebra based on logics has been introduced. The relevance of this topic lies in the fact that basic process of deduction or the reasoning implicit in the mathematisation is based on the propositional calculus which in turn forms the basis of algorithms as the backbone of computing device.
- Keeping in view the feedback received from various corners, the overall load has been reduced by way of deleting certain topics such as correlation and regression, computing, numerical methods and some concepts from trigonometry and two-dimensional geometry etc.
- In order to relate mathematics with real life situations and other subject areas, emphasis has been made on application of various concepts.
- Higher secondary education is the threshold for future career of learners and, therefore, keeping in view their professional interest, syllabus has been classified in three parts namely, A, B and C except semester I which is compulsory for all. However, for the remaining semesters students opting for science and professional courses like engineering,



computer education or higher studies in mathematics, Parts A and B are suggested as per the professional needs of the aspirants; and for those entering into Commerce or Social Science and other related disciplines, Parts A and C are suggested catering their needs for development of appropriate competencies under the process of semesterisation.

### Objectives

At the end of the higher secondary stage, the pupil:

- acquires knowledge and critical understanding of basic concepts, facts, principles, terms, symbols and mastery of processes and skills;
- applies mathematical knowledge and skills to solve problems within mathematics and problems from other subject areas;
- develops positive attitudes to think, reason, analyze and articulate logically;
- develops appreciation for the power and beauty of mathematics for its applications in Sciences, Social Sciences, Information Technology, humanity and arts;
- develops interests in mathematics by participating in mathematical competitions, engaging himself/herself in self learning;
- develops necessary skills to work with modern technological devices such as calculators, computers, etc., and develops understanding of cause-effect relationships and interplay of variables;
- develops reverence and respect towards great mathematicians, particularly towards the Indian mathematicians for their contribution in the field of mathematics.

These objectives are drawn in light of the consensus that emerged out of the national debate on various issues of mathematics education at the higher secondary stage.

To achieve the desired objectives, the following is the detailed syllabus at Higher Secondary stage. The syllabus is arranged in chapters spread over four semesters. The time in terms of periods has been mentioned for each chapter to help the writers of the instructional materials. The broad arrangements in each chapter have topics and sub topics.

### Course Structure

#### CLASS XI

##### Semester I

- |            |   |
|------------|---|
| Chapter 1  | Sets  |
| Chapter 2  | Relations and Functions                     |
| Chapter 3  | Mathematical Induction                      |
| Chapter 4  | Logarithms                                  |
| Chapter 5  | Complex Numbers                             |
| Chapter 6  | Linear Inequations                          |
| Chapter 7  | Quadratic Equations                         |
| Chapter 8  | Sequences and Series                        |
| Chapter 9  | Trigonometry                                |
| Chapter 10 | Cartesian System of Rectangular Coordinates |
| Chapter 11 | Straight Lines and Family of Straight Lines |

##### Semester II

###### Part A (Core)

- |            |                                    |
|------------|------------------------------------|
| Chapter 12 | Circles                            |
| Chapter 13 | Conic Sections                     |
| Chapter 14 | Trigonometry (continued)           |
| Chapter 15 | Permutations and Combinations      |
| Chapter 16 | Binomial Theorem                   |
| Chapter 17 | Exponential and Logarithmic Series |
| Chapter 18 | Mathematical Logic                 |
| Chapter 19 | Statistics                         |

###### Part B

- |            |  |
|------------|--|
| Chapter 20 | Introduction to Three-Dimensional Geometry |
| Chapter 21 | Vectors                                    |

###### Part C

- |            |                               |
|------------|-------------------------------|
| Chapter 22 | Stocks, Shares and Debentures |
| Chapter 23 | Average and Partition Values  |
| Chapter 24 | Index Numbers                 |

#### CLASS XII

##### Semester III

###### Part A (Core)

- |           |                                  |
|-----------|----------------------------------|
| Chapter 1 | Matrices and Determinants        |
| Chapter 2 | Boolean Algebra                  |
| Chapter 3 | Probability                      |
| Chapter 4 | Functions, Limits and Continuity |



**Chapter 5 Differentiation****Part B****Chapter 6 Vectors (continued)****Chapter 7 Three-Dimensional Geometry****Part C****Chapter 8 Partnership****Chapter 9 Bill of Exchange****Chapter 10 Linear Programming****Semester IV****Part A (Core)****Chapter 11 Applications of Derivatives****Chapter 12 Indefinite Integrals****Chapter 13 Definite Integrals****Chapter 14 Differential Equations****Part B****Chapter 15 Elementary Statics****Chapter 16 Elementary Dynamics****Part C****Chapter 17 Annuities****Chapter 18 Applications of Calculus in Commerce and Economics****Chapter 19 Probability****CLASS XI****Semester I****Chapter 1 - Sets (Periods 8)**

Sets and their representations, Finite and infinite sets, Empty set, Equal sets, Subsets, Power set, Universal set, Venn diagrams, Complement of a set, Operations on sets (union, intersection and difference of two sets), Applications of sets.

**Chapter 2 - Relations and Functions (Periods 12)**

Ordered pairs, Cartesian product of sets, Relations, domain, co-domain and range, Functions - into and onto functions, one-one into and one-one onto functions, Constant function, Identity function, Composition of functions, Invertible functions, Binary operations.

**Chapter 3 - Mathematical Induction (Periods 6)**

The principle of mathematical induction, Simple applications.

**Chapter 4 - Logarithms (Periods 10)**

Meaning of logarithm of a number to a given base  $a$ ,  $a > 0$ ,  $a \neq 1$ , Laws of logarithms including change of base, Common logarithm (Base 10), Characteristic and mantissa, Antilogarithms, Logarithmic tables, Applications of logarithms to problems of compound interest, growth and decay (depreciation).

**Chapter 5 - Complex Numbers (Periods 10)**

Complex numbers in the form  $a + ib$ , Real and imaginary parts of a complex number, Complex conjugate, Argand diagram, Representation of a complex number by a point in a plane, Modulus and argument of a complex number, Algebra of complex numbers, Triangle inequality:  $|Z_1 + Z_2| \leq |Z_1| + |Z_2|$  and also  $|Z_1 \cdot Z_2| = |Z_1| \cdot |Z_2|$ , Polar representation of a complex number, Square root of a complex number, Cube roots of unity.

**Chapter 6 - Linear Inequations (Periods 8)**

Solution of a linear inequation in one variable and its graphical representation, Solution of system of linear inequations in one variable, Graphical solutions of linear inequations in two variables, Solution of system of linear inequations in two variables.

**Chapter 7 - Quadratic Equations (Periods 12)**

Solution of a quadratic equation in the complex number system by (i) Factorization (ii) Using formula, Relation between roots and coefficients, Nature of roots, Formation of quadratic equations with given roots, Symmetric functions of roots, Equations reducible to quadratic forms.

**Chapter 8 - Sequences and Series (Periods 12)**

Sequence and examples of finite and infinite sequences, Arithmetic progression (A.P.) - first term, common difference and  $n$ th term, Sum to  $n$  terms of an A.P. Arithmetic mean (A.M.), insertion of arithmetic means between any two given numbers, Geometric progression (G.P.), first term, common ratio and  $n$ th term, Sum to  $n$  terms and infinite number of terms of a G.P. Recurring decimal numbers as geometric series, Geometric mean (G.M.), insertion of Geometric means between any two given numbers, Harmonic Progression, Harmonic Mean (H.M.), relationship among A.M., G.M. and H.M., Arithmetico - geometric series, sum to  $n$  terms and sum of infinite arithmetico-geometric series, Special series:  $\sum n$ ,  $\sum n^2$ ,  $\sum n^3$ , Sum of



series using above special series.

### Chapter 9 - Trigonometry (Periods 20)

Degree measure and radian measure of positive and negative angle, relation between degree and radian, Definition of trigonometric functions with the help of a unit circle, Periodic functions, concept of periodicity of Trigonometric functions, Values of trigonometric functions of  $x$  for  $x=0, \pi/6, \pi/4, \pi/3, \pi/2, \pi, 3\pi/2, 2\pi$ . Trigonometric functions of sum and difference of numbers:  
 $\sin(x \pm y) = \sin x \cos y \pm \cos x \sin y$ ;  
 $\cos(x \pm y) = \cos x \cos y \mp \sin x \sin y$ ,

$$\tan(x \pm y) = \frac{\tan x \pm \tan y}{1 \mp \tan x \tan y}$$

$$\sin(2\pi \pm x) = \pm \sin x, \quad \cos(2\pi \pm x) = \cos x, \\ \cos(-x) = \cos x,$$

$$\sin(-x) = -\sin x, \quad \cos\left(\frac{\pi}{2} + x\right) = \pm \sin x,$$

$$\sin\left(\frac{\pi}{2} - x\right) = \cos x, \quad \cos(\pi + x) = -\cos x,$$

$$\sin(\pi + x) = \pm \sin x,$$

Trigonometric functions of multiples and submultiples of numbers,  $\sin 2x = 2 \sin x \cos x$ ,  
 $\cos 2x = 1 - 2\sin^2 x = 2\cos^2 x - 1 = \cos^2 x - \sin^2 x$ ,

$$\sin 3x = 3 \sin x - 4 \sin^3 x, \quad \cos 3x = 4 \cos^3 x - 3 \cos x,$$

$$\tan 3x = \frac{3 \tan x - \tan^3 x}{1 - 3 \tan^2 x}$$

$$\sin x + \sin y = 2 \sin \frac{x+y}{2} \cos \frac{x-y}{2}$$

$$\cos x + \cos y = 2 \cos \frac{x+y}{2} \cos \frac{x-y}{2}$$

$$\sin x - \sin y = 2 \cos \frac{x+y}{2} \sin \frac{x-y}{2}$$

$$\cos x - \cos y = -2 \sin \frac{x+y}{2} \sin \frac{x-y}{2}$$

Conditional identities for the angles of a triangle, Graph of the following trigonometric functions:  $y = \sin x$ ,  $y = \cos x$ ,  $y = \tan x$ ,  $y = a \sin x$ ,  $y = a \cos x$ ,  $y = a \sin bx$ ,  $y = a \cos bx$ .

### Chapter 10-Cartesian System of Rectangular Coordinates (Periods 10)

Recall of Cartesian system of coordinates in a plane, Distance formula, Section formula, centroid and incentre, Area of a triangle, condition for the collinearity of three points in a plane, Slope of a line, parallel and perpendicular lines, Intercepts

of a line on the coordinate axes, Locus and its equation.

### Chapter 11- Straight Line and Family of Straight Lines (Periods 12)

Various forms of equations of a line - Parallel to axes, Slope Intercept form, the point slope form, Symmetric form, parametric equations of a line, Two point form, Intercept form, Normal form, General form, Intersection of lines, Equation of bisectors of angle between two lines, Angle between two lines, condition for concurrency of three lines, Distance of a point from a line, Equations of family of lines through the intersection of two lines, Translation of axes.

#### Semester II

**Note :** Part A (Core Topics) is compulsory for every student. In addition he/she may opt for either Part B or Part C.

Time: 120 Periods (90 Periods for Part A, 30 Periods each for Parts B and C)

#### Part - A

### Chapter 12 - Circles (Periods 10)

Standard form of the equation of a circle, General form of the equation of a circle, its radius and centre, Equation of the circle in the parametric form, Equation of a circle when the end points of a diameter are given, Points of intersection of a line and a circle with centre at the origin, Condition for a line to be tangent to the given circle, Equation of a tangent to a circle and length of the tangent.

### Chapter 13 - Conic Sections (Periods 10)

Sections of a cone, Equations of conic sections (Parabola, Ellipse and Hyperbola) in standard form, Applications.

### Chapter 14 - Trigonometry (Continued)

(Periods 15)

Solution of Trigonometric equations of the type  $\sin \theta = \sin \alpha$ ,  $\cos \theta = \cos \alpha$ ,  $\tan \theta = \tan \alpha$ , and equations reducible to these forms, Solution of triangles : Proof and applications of the following formulae :

$$(i) \quad \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$(ii) \quad \cos A = \frac{b^2 + c^2 - a^2}{2bc}, \text{ etc.}$$

$$(iii) \quad a = b \cos C + c \cos B, \text{ etc.}$$



$$(iv) \sin A/2 = \sqrt{\frac{(s-c)(s-b)}{bc}}, \text{ etc.}$$

$$(v) \cos A/2 = \sqrt{\frac{s(s-a)}{bc}}, \text{ etc.}$$

$$(vi) \Delta = (1/2) b c \sin A, \text{ etc.}$$

$$(vii) \text{Napier's analogy, } \tan \frac{B-C}{2} = \frac{b-c}{b+c} \cot A/2$$

Problems on heights and distances, Concept of inverse trigonometric functions and their use to reduce expressions to simplest forms

$$(i) \sin^{-1}(\sin x) = x \text{ and other similar formulae,}$$

$$(ii) \sin^{-1}(1/x) = \operatorname{cosec}^{-1}x \text{ and other similar formulae,}$$

$$(iii) \sin^{-1}(-x) = -\sin^{-1}x, \tan^{-1}(-x) = -\tan^{-1}x, \\ \operatorname{cosec}^{-1}(-x) = -\operatorname{cosec}^{-1}x, \cos^{-1}(-x) = \pi - \cos^{-1}x, \\ \sec^{-1}(-x) = \pi - \sec^{-1}x, \cot^{-1}(-x) = \pi - \cot^{-1}x$$

$$(iv) \sin^{-1}x + \cos^{-1}x = \pi/2, \tan^{-1}x + \cot^{-1}x = \pi/2, \\ \operatorname{cosec}^{-1}x + \sec^{-1}x = \pi/2,$$

$$(v) \tan^{-1}x + \tan^{-1}y = \tan^{-1} \frac{x+y}{1-xy}, x y < 1$$

$$(vi) \tan^{-1}x - \tan^{-1}y = \tan^{-1} \frac{x-y}{1+xy}, xy > -1$$

$$(vii) 2 \tan^{-1} x = \sin^{-1} \frac{2x}{1+x^2} = \cos^{-1} \frac{1-x^2}{1+x^2} =$$

$$\tan^{-1} \frac{2x}{1-x^2}, |x| < 1$$

Applications.

### Chapter 15 - Permutations and Combinations (Periods 12)

Fundamental principle of counting, The factorial notation, Permutation as an arrangement, meaning of  $P(n,r)$ , Combination, meaning of  $C(n,r)$ , Applications of permutations and combinations.

### Chapter 16 - Binomial Theorem (Periods 12)

Statement of Binomial Theorem, Proof of Binomial theorem for positive integral exponent using principle of mathematical induction and also by combinatorial method, General and middle terms in binomial expansions, Properties of Binomial coefficients, Binomial theorem for any index (without proof), Application of Binomial Theorem.

### Chapter 17 - Exponential and Logarithmic Series (Periods 12)

Concept of  $e$  as the sum of an infinite series, proof

of  $2 < e < 3$ , Exponential function ( $e^x$ ) as the infinite series,  $1 + \frac{x}{1!} + \frac{x^2}{2!} + \dots$  and its graph

Logarithmic function ( $\log_e x$ ) and its graph, The infinite series for  $\log_e(1+x)$ ,  $\log_e(1-x)$ .

### Chapter 18 - Mathematical Logic (Periods 12)

Statements, Use of Venn diagrams in logic, Negation operation, Basic logical connectives and compound statements including their negations, Truth tables, Tautology, Duality, Algebra of statements, Application of logic in solving simple problems.

### Chapter 19 - Statistics (Periods 7)

Mean deviation for ungrouped data, Variance for grouped and ungrouped data, Standard deviation.

### Part - B

### Chapter 20 - Introduction to Three Dimensional Geometry (Periods 14)

Coordinate axes and coordinate planes in three dimensional space, Coordinate of a point in space, Distance between two points, Section formula, Direction cosines and direction ratios of a line joining two points, Projection of the join of two points on a given line, Angle between two lines whose direction ratios are given.

### Chapter 21 - Vectors (Periods 16)

Vectors and scalars, Magnitude and direction of a vector, Types of vectors (equal vectors, unit vector, zero vector, position vector of a point, localized and free vectors, parallel and collinear vectors, negative of a vector, Components of a vector, Addition of vectors, Multiplication of a vector by a scalar, Position vector of a point dividing a line segment in a given ratio, Application of vectors in geometry.

### Part - C

### Chapter 22 - Stocks, Shares and Debentures (Periods 12)

Shares and their types, Face value and market value of a share and dividend, Stock and Brokerage, Calculation of income on stocks and shares, Market value of a stock, Sale and purchase of stocks, Shares, debentures their sale/purchase and income thereon

### Chapter 23 - Average and Partition Values (Periods 10)

Types of averages, mode and median, Partition values, quartiles, deciles and percentiles,



Computation of partition values, Merits and demerits of different partition values.

### **Chapter 24 - Index Numbers** (Periods 8)

Index numbers - definition and uses, Construction of index numbers, Aggregate method, Simple average of relative method using arithmetic mean and problems.

## **CLASS XII**

### **Semester III**

**Note:** Part A (Core Topics) is compulsory for every student. In addition he/she may opt for either Part B or Part C.

**Time:** 120 Periods (90 Periods for Part A, 30 Periods each for Parts B and C)

### **Part - A (Core)**

#### **Chapter 1 - Matrices and Determinants** (Periods 20)

Concept of a matrix, types of matrices, Equality of matrices (only real entries) may be considered, Operations of addition, scalar multiplication and multiplication of matrices, Statements of important results on operations of matrices and their verification by numerical problems only, Determinant of a square matrix, Properties of determinants, Minors and cofactors, Applications of determinants in (i) finding area of a triangle, (ii) solving a system of linear equations, Transpose, adjoint and inverse of a matrix, Consistency and inconsistency of system of linear equations, Solving system of linear equations, In two or three variables using inverse of a matrix.

#### **Chapter 2 - Boolean Algebra** (Periods 15)

Boolean algebra as an algebraic structure, Principle of duality, Boolean function, Conditional and biconditional statements, Valid arguments, Switching circuits, Application of Boolean algebra to switching circuits.

#### **Chapter 3 - Probability** (Periods 18)

Random experiments and sample space, events as subsets of sample space, occurrence of an event, sure and impossible events, exhaustive events, algebra of events, meaning of equally likely outcomes, Probability of an event, theorems on probability: addition rule, multiplication rule, Independent experiments and independent events [finding  $P(A \text{ or } B)$ ,  $P(A \text{ and } B)$ ], Random variables, Probability distribution of a random variable.

### **Chapter 4 - Functions, Limits and Continuity** (Periods 12)

Concept of a real function, its domain and range, Types of functions and their graphs, Limit of a function, meaning and related notations, Left and right hand limits,

Fundamental theorems on limits (statement only), Proof of the standard limits:

$$\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = na^{n-1} (a > 0), \quad \lim_{x \rightarrow 0} \frac{\sin x}{x} = 1,$$

Limit at infinity and infinite limits, Continuity of a function (i) at a point, (ii) over an open/closed intervals, Sum product and quotient of continuous functions, Continuity of special functions-polynomial, trigonometric, exponential logarithmic, inverse trigonometric functions.

### **Chapter 5 - Differentiation** (Periods 25)

Derivative of a function, its geometrical and physical significance, Relationship between continuity and differentiability, Derivative of some simple functions from first principle, Derivative of sum, difference, product and quotient of functions, Derivative of polynomial, trigonometric, exponential, logarithmic, Inverse trigonometric and implicit functions, Logarithmic differentiation, Derivative of functions expressed in parametric form, chain rule and differentiation by substitution, Derivatives of second order.

### **Part - B**

#### **Chapter 6 - Vectors (continued)** (Periods 12)

Scalar (or dot) product of vectors, Projection of a vector on a line, Vector (or cross) product of two vectors, Application of dot and cross products in (i) finding areas of triangle and a parallelogram, (ii) problems of plane geometry and trigonometry, (iii) finding work done by a force, (iv) vector moment of a vector about a point, Scalar triple product and its applications, Moment of a vector about a line, Coplanarity of three vectors or four points using scalar triple product, Vector triple product.

#### **Chapter 7 - Three Dimensional Geometry** (Periods 18)

Cartesian and vector equation of a line through (i) a point and parallel to a given vector, (ii) through two points, Collinearity of three points, Coplanar and skew lines, shortest distance between two lines, condition for the intersection of two lines, Cartesian and vector equation of a plane (i) when the normal vector and the distance of the plane



from the origin is given, (ii) passing through a point and perpendicular to a given vector, (iii) passing through a point and parallel to two given lines through the intersection of two other planes, (iv) containing two lines, (v) passing through three points, Angle between (i) two lines (ii) two planes, (iii) a line and a plane. Condition of coplanarity of two lines in vector and Cartesian form, length of perpendicular of a point from a plane by both vector and Cartesian methods, vector and Cartesian equation of a sphere, its centre and radius, diameter form of the equation of a sphere.

## PART - C

### Chapter 8 - Partnership (Periods 6)

Investment of capital for unequal period, sharing of profit, Partner's salaries, interest on capital, Profit sharing on the admission of a new partner/retirement of an existing partner.

### Chapter 9 - Bill of Exchange (Periods 8)

Introduction, Bankers discount and true discount, Bankers gain.

### Chapter 10 - Linear Programming

(Periods 16)

Introduction, definition of related terminology such as constraints, objective function, optimization, isoprofit, isocostlines, Advantages of linear programming, Limitations of linear programming, Application areas of linear programming, Different types of linear programming, (L.P.). Problems, Mathematical formulation of L.P. problems, Graphical method of solution for problems in two variables, Feasible and infeasible regions, feasible and infeasible solutions, optimum feasible solution.

## Semester IV

**Note:** Part A (Core Topics) is compulsory for every student. In addition he/she may opt for either Part B or Part C.

**Time:** 120 Periods (90 Periods for Part A, 30 Periods each for Parts B and C)

## Part - A (Core)

### Chapter 11 - Applications of Derivatives

(Periods 25)

Rate of change of quantities, Tangents and normals, Increasing and decreasing functions and sign of the derivatives, Maxima and minima,

greatest and least values, Rolle's theorem and Mean Value theorem (without proof), Approximation by differentials, Curve sketching of simple curves

### Chapter 12 - Indefinite Integrals (Periods 25)

Integration as inverse of differentiation, Properties of integrals, Integration by substitution, Partial fractions and their use in integrating rational functions, Integral of the type —

$$\int \frac{dx}{x^2 \pm a^2}; \int \frac{dx}{a^2 - x^2}; \int \frac{dx}{\sqrt{x^2 \pm a^2}}; \int \frac{dx}{\sqrt{a^2 - x^2}}$$

$$\int \frac{dx}{ax^2 + bx + c}; \int \frac{(px + q) dx}{ax^2 + bx + c};$$

$$\int \frac{dx}{\sqrt{ax^2 + bx + c}}; \int \frac{(px + q) dx}{\sqrt{ax^2 + bx + c}};$$

Integration by parts, Integral of the types:

$$\int e^{ax} \sin bx dx; \int \sqrt{x^2 \pm a^2} dx; \int \sqrt{a^2 - x^2} dx$$

$$\int \sqrt{(ax^2 + bx + c)} dx; \int (px + q) \sqrt{(ax^2 + bx + c)} dx;$$

$$\int \frac{dx}{a + b \cos x}; \int \frac{dx}{a + b \sin x}; \int \sin^{-1} x dx \text{ etc.}$$

### Chapter 13 - Definite Integrals (Periods 25)

Definite integral as limit of a sum, Fundamental theorems of integral calculus (without proof), Evaluation of definite integrals by: (i) substitution, (ii) using properties of definite integrals:

$$\int_a^b f(x) dx = - \int_b^a f(x) dx$$

$$\int_a^b f(x) dx = \int_a^c f(x) dx + \int_c^b f(x) dx$$

$$\int_a^b f(x) dx = \int_a^b f(a + b - x) dx$$

$$\int_0^a f(x) dx = \int_0^a f(a - x) dx$$

$$\int_0^{2a} f(x) dx = \int_0^a f(x) dx + \int_0^a f(2a - x) dx$$



$$\int_0^{2a} f(x) dx = 2 \int_0^a f(x) dx \text{ if } f(2a-x) = f(x)$$

$$\int_0^{2a} f(x) dx = 0 \text{ if } f(2a-x) = -f(x)$$

$$\int_{-a}^a f(x) dx = 2 \int_0^a f(x) dx \text{ if } f(x) \text{ is even function and} \\ = 0 \text{ if } f(x) \text{ is odd function of } x$$

Application of definite integrals in finding areas bounded by a curve, Circle parabola and ellipse in standard form between two ordinates and x-axis, Area between two curves, line and circle, line and parabola, line and ellipse,

### Chapter 14 - Differential Equations

(Periods 15)

Definition, order and degree, General and particular solution of a differential equation, Formation of differential equations whose general solution is given, Solution of differential equations by method of separation of variables, Homogeneous differential equations of first order and their solutions, Solution of linear differential equations of the type :

$\frac{dy}{dx} + P(x)y = Q(x)$ , where  $P(x)$  and  $Q(x)$  are functions of  $x$ , Solutions of second order differential equations :

$$\frac{d^2y}{dx^2} = f(x)$$

### Part - B

### Chapter 15 - Elementary Statics

(Periods 14)

Introduction, basic concepts and basic laws of mechanics, force, resultant of forces acting at a

point, parallelogram law of forces, resolved parts of a force, Equilibrium of a particle under three concurrent forces, triangle law of forces and its converse, Lami's theorem and its converse, Two parallel forces, like and unlike parallel forces, couple and its moment.

### Chapter 16 - Elementary Dynamics

(Periods 16)

Basic concepts - displacement, speed and velocity, average speed, instantaneous speed, acceleration and retardation, resultant of two velocities. Motion of a particle along a line when moving with constant acceleration, motion of a particle under gravity, Projectile motion - the path of a projectile, its horizontal range, velocity at any instant, greatest height and time of flight.

### Part - C

### Chapter 17 - Annuities

(Periods 8)

Annuity and its types, Present value and amount in case of (i) ordinary annuity (ii) annuity due (iii) deferred annuity, Sinking fund

### Chapter 18 - Applications of Calculus in Commerce and Economics

(Periods 8)

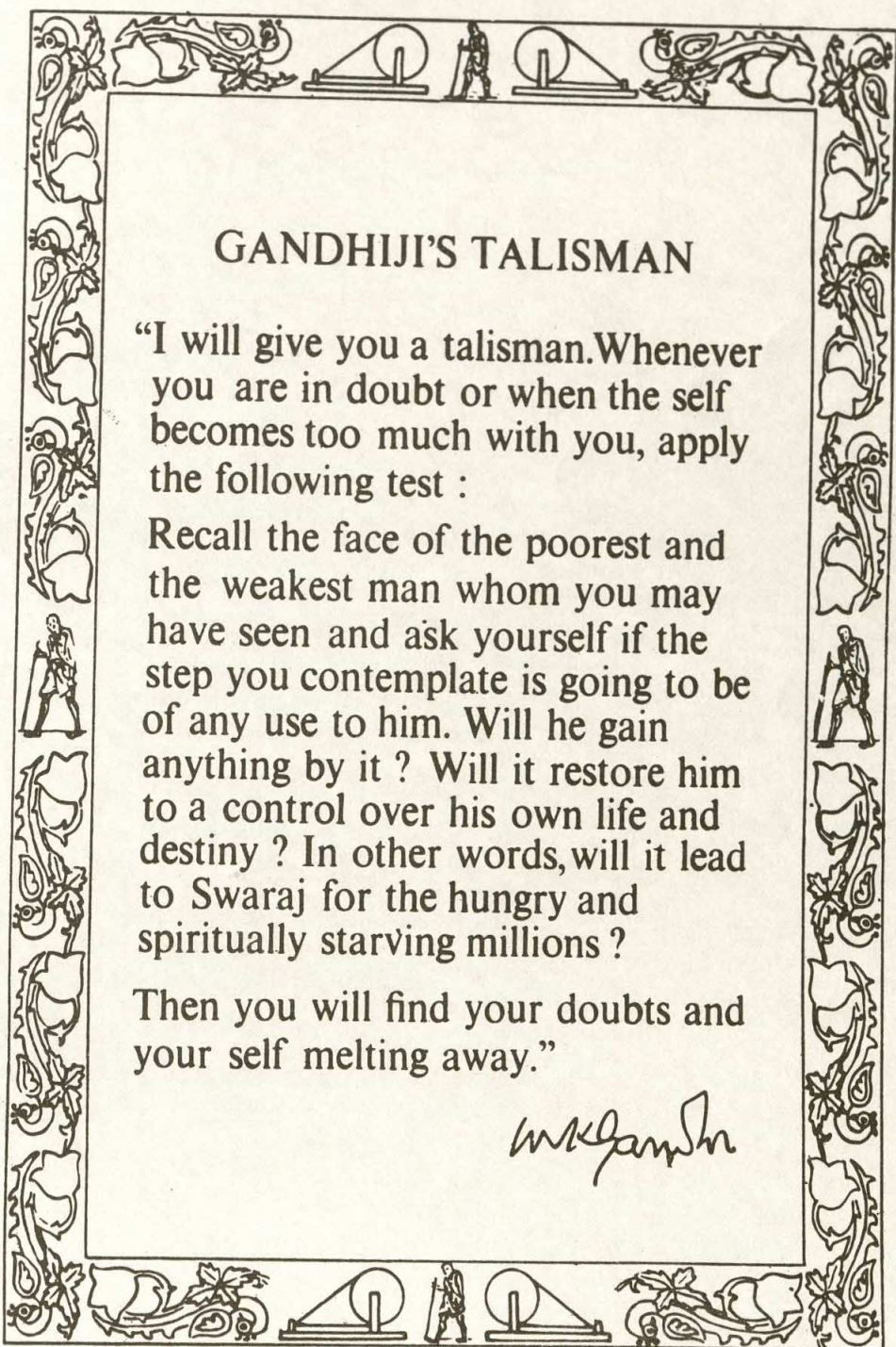
Average cost and marginal cost, Total revenue, average revenue and marginal revenue, Break even analysis, Maximization of total revenue and total profits, Minimization of average cost

### Chapter 19 - Probability

(Periods 14)

Conditional probability, Baye's theorem and its applications, Recall of concept of random variables and its probability distribution, Mean and variance of random variables, Binomial and Poisson's distributions, their mean, variance and applications, Applications of these distributions in commerce and industry





## GANDHIJI'S TALISMAN

"I will give you a talisman. Whenever you are in doubt or when the self becomes too much with you, apply the following test :

Recall the face of the poorest and the weakest man whom you may have seen and ask yourself if the step you contemplate is going to be of any use to him. Will he gain anything by it ? Will it restore him to a control over his own life and destiny ? In other words, will it lead to Swaraj for the hungry and spiritually starving millions ?

Then you will find your doubts and your self melting away."

*M.K. Gandhi*



## CANDIDUS TALISMAN

I will give you a talisman, however  
you are in doubt or when the soil  
becomes too much with you, apply  
the following test  
Recall the face of the poorest and  
the weakest man whom you may  
have seen and ask yourself if the  
step you contemplate is going to be  
of any use to him. Will he gain  
anything by it? Will it restore him  
to a control over his own life and  
destiny? In other words will it lead  
to swart for the hungry and  
continually starving millions?

Then you will find your doubts and  
your self melting away.

Robert Lynd







